

DEPARTMENT OF DEFENSE APPROPRIATIONS FOR FISCAL YEAR 2014

WEDNESDAY, JULY 17, 2013

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 9 a.m., in room SD-192, Dirksen Senate Office Building, Hon. Richard J. Durbin (chairman) presiding. Present: Senators Durbin, Cochran, Shelby, Collins, and Murkowski.

DEPARTMENT OF DEFENSE

MISSILE DEFENSE AGENCY

STATEMENT OF VICE ADMIRAL JAMES D. SYRING, DIRECTOR, UNITED STATES NAVY

OPENING STATEMENT OF SENATOR RICHARD J. DURBIN

Senator DURBIN. The subcommittee meets this morning to receive testimony on fiscal year 2014 budget request for the Missile Defense Agency (MDA). And I'm pleased to welcome the Director, Vice Admiral James Syring, from Indiana. Thank you for appearing before the committee.

For fiscal year 2014, the President's budget asks for \$7.7 billion for this agency. It's roughly equivalent to the amount provided in fiscal year 2013 after sequestration but assumes sequestration in 2014 will not happen. I hope to hear more from the admiral today on the impact of sequestration on this fiscal year and what cuts in the future might mean.

While the United States is facing a number of threats around the world in the area of missile proliferation, including programs in Iran and North Korea, these policy problems require use of a number of political, economic, and military tools. The Missile Defense Agency brings capabilities to the table to face those challenges.

It's our responsibility to ensure that those capabilities perform as advertised, remain focused on realistic threats, and be honest about the testing and results. We know the threat is real; the question is whether our defense is real.

President Obama summed up the approach in 2009 in these words: "The best way to responsibly advance our security and the security of our allies is to deploy a missile defense system that best responds to the threats that we face and utilizes technology both proven and cost effective." The President is taking bold steps to

counter threats in North Korea and Iran, including most recently ordering the first-ever deployment of the Terminal High-Altitude Area Defense (THAAD) battery to Guam. This deployment was accelerated by 2 years in light of North Korean provocations. I would like for the admiral to update us on that.

In addition, in March, Secretary Hagel announced four major steps MDA will take to bolster our defense from the threat of long-range ballistic missiles. One key aspect is the planned expansion, the ground-based mid-course defense (GMD) system.

Before it can be expanded, we need to know these missiles perform as advertised through rigorous intercept tests. These tests aren't easy, and they aren't cheap. But they're critical if we're going to adhere to the President's guidance that our technology must be "proven and cost effective."

We are painfully aware of the recent test failure just a few days ago, on July 5. This committee will appreciate the admiral's explanation of what happened. Prior to this month, the same system had two high-profile test failures, in the year 2010, as well. Furthermore, given the difficult fiscal environment we face, we need to understand the costs of any proposed expansion of the program.

I have several questions on the ground-based mid-course defense plan to ensure the system is reliable and affordable. Secretary Hagel also emphasized the U.S. continued commitment to North Atlantic Treaty Organization (NATO) and her allies, the European Phased Adaptive Approach. Last month, the Aegis program had another successful intercept when the USS *Lake Erie* intercepted a target over the Pacific Ocean, using a Block 1-B standard missile.

Of course, none of these issues we discuss today can happen without the dedicated military and civilian employees who work so hard to keep us safe. Civilian employees are an integral part of the Missile Defense Agency team. So, we would like to know the impact of the 11-day furlough that began in July due to sequestration.

I commend to all of those at this hearing an article written this morning by a civilian employee of the Air Force that is printed in the Washington Post, talking about the disappointment that he feels, having dedicated his life first to the uniformed military and now to the civilian military, and facing the furlough on sequester. Based on the fact that he's given so much of his life to defending this country, he can't understand this approach. Neither can I.

I look forward to working with you to address these important issues, as well as to ensure our fiscal year 2014 appropriation bill enables the Missile Defense Agency to defend and support our Nation and interests around the world, at the same time being fiscally responsible.

I thank the admiral for his testimony this morning. His full statement will be included in the record.

Senator DURBIN. Before I turn to him, I'm going to ask the ranking vice chair on the full committee, Senator Shelby, if he has any opening remarks.

STATEMENT OF SENATOR RICHARD C. SHELBY

Senator SHELBY. Thank you, Mr. Chairman. Mr. Chairman, I'll try to be brief here, but I think this is a very important hearing you've called here. Mr. Chairman, I join you today here in wel-

coming Vice Admiral Syring as Director of the Missile Defense Agency.

Admiral Syring is tasked with defending the United States deployed forces, allies, and friends against ballistic missile attacks. And as you mentioned in your testimony, Admiral, the threat continues to grow as our potential adversaries are acquiring a greater number of ballistic missiles, increasing their range, and making them more complex, survivable, reliable, and accurate. I concur with this assessment and believe that it's vital to ensure a robust level of funding in the missile defense program to combat these complex emerging threats.

PREPARED STATEMENT

I look forward to working with you, as I have. And I also look forward to your testimony here today to ensure that our country is appropriately prepared now and in the future against ballistic missile attacks.

Thank you, Mr. Chairman.

Senator DURBIN. Thank you very much, Senator Shelby. I will be including in the record a statement from Senator Cochran.

[The statement follows:]

PREPARED STATEMENT OF SENATOR THAD COCHRAN

Mr. Chairman, I am pleased to join you in welcoming the Director of the Missile Defense Agency, Vice Admiral James Syring.

Admiral, it appears that your success with Aegis and the development, testing and acquisition of other complex weapon systems has landed you in one of the toughest, most complex jobs in the Department of Defense. Hitting a bullet with a bullet thousands of miles away is no simple task.

We thank you for your willingness to serve in this important position, and we are pleased to have you provide testimony today on what is needed and planned for this coming fiscal year for missile defense. I have been a strong advocate for a national missile defense system, and I am encouraged by the progress since legislation was first introduced in 1998.

An effective missile defense is needed today more than ever. North Korea continues to test nuclear capabilities and long range launch vehicles, and Iran has successfully launched satellites into space, showing they have the capability to develop a long range ballistic missile. Even with the recent missed intercept test, the ground-based element of this architecture has had more successful intercept tests than failures, and so we know this concept can work, but there is a great deal more to be done to ensure this system's reliability.

Considering the recent events with North Korea, I am encouraged by the President's decision to increase the number of operational Ground-Based Interceptors (GBIs) from 30 to 44 to enhance our national missile defense posture. But I question whether we are doing all that is technically feasible, today, to address complex threats and large raid sizes. I have been informed that the performance of our missile defense system can be increased in the near term by enhancing discrimination. I hope this is something we will be able to discuss in some detail during today's hearing.

Thank you, Mr. Chairman.

Senator DURBIN. Admiral Syring, please proceed.

SUMMARY STATEMENT OF VICE ADMIRAL JAMES D. SYRING

Admiral SYRING. Good morning, Chairman Durbin, Senator Shelby. I appreciate the opportunity to testify before you today for the first time as the Director of the Missile Defense Agency.

On July 5, we conducted an intercept test of the upgraded Capability Enhancement-1 exo-atmospheric kill vehicle (EKV). Although

we successfully launched the ground-based interceptor (GBI) in FTG-07, it failed to intercept the LV-2 target.

We have started an extensive review to determine the cause of the failure. We did demonstrate all possible secondary objectives to include demonstrations of the ballistic missile defense (BMD) system sensors, the first use of Aegis BMD as a ground-based mid-course defense launch-on sensor, C2BMC, and war-fighter tactic techniques and procedures.

However, the overall test was a failure because the primary objective of intercepting the target was not met. I am committed to conducting a full evaluation of the path ahead for the GMD program, to include more regular testing, an acceleration of the CE-II upgrades after intercept testing, or redesign and upgrade of the current EKV.

Regardless of the path we embark on, we will aggressively attack any substantiated quality control problems coming out of the failure review board that need to be corrected through the program. We will continue to keep Congress apprised of our decisions.

Mindful of this failure to intercept and pending the outcome of our investigation, we will work with the war-fighter and Director, Operational Test and Evaluation (DOT&E) communities to determine the path forward and timing for our next GMD flight test, which could involve a repeat of the July 2013 intercept flight test attempt, using the CE-I configuration or an intercept flight test using the currently planned CE-II configuration. What's important is continued testing.

We are taking other steps over the next few years to implement Secretary Hagel's March 15 guidance to strengthen our homeland defenses. We are increasing the operational fleet of GBIs from 30 to 44 by 2017. This will involve the reallocation of GBIs and the refurbishment and reactivation of Missile Field 1 in Alaska.

The decision to increase the number of deployed GBIs, of course, assumes a successful return to intercept of the next-generation EKV, the CE-II, and that the results of the FTG-07 failure investigation do not point to any problematic common components within the currently planned production GBI.

We have begun our evaluation of locations in the continental United States to determine a site suitable for possible future deployment of homeland defense interceptors. Also, in order to provide more robust sensor coverage for homeland defense, this year we are working with our Japanese partners to deploy a second AN/TPY-2 radar to Japan.

We will continue to strengthen regional defenses with funding to operate and sustain command control battle management and communications, and the AN/TPY-2 radars at the fielded sites. We will also deliver more interceptors for the Terminal High-Altitude Area Defense program and Aegis ballistic missile defense.

PREPARED STATEMENT

MDA will continue to fund upgrades to phase one of the European phased adaptive approach and proceed on our schedule to complete the Aegis Ashore sites in Romania by 2015 and in Poland by 2018.

Sir, I ask that my written statement be accepted into the record, and I look forward to answering the committee's questions. Thank you.

[The statement follows:]

PREPARED STATEMENT OF VICE ADMIRAL JAMES D. SYRING

Good morning, Chairman Durbin, Ranking Member Cochran, distinguished members of the subcommittee. I appreciate this opportunity to testify before you for the first time as the Director of the Missile Defense Agency (MDA). Our current budget request of \$7.684 billion for fiscal year 2014 will continue the development of defenses for our Nation, deployed forces, allies, and international partners against increasingly capable ballistic missiles. Since the previous Director testified before you last year, we have made good progress in the development and deployment of the Ballistic Missile Defense System (BMDS) and we continue to build capabilities to defeat more complex threats. My priorities in fiscal year 2014 are to continue our strong support of the warfighter, support what we have deployed, and deliver more capability to the Combatant Commanders (COCOMs).

BALLISTIC MISSILE THREAT

The threat continues to grow as our potential adversaries are acquiring a greater number of ballistic missiles, increasing their range and making them more complex, survivable, reliable, and accurate. The missile defense mission is becoming more challenging as potential adversaries incorporate BMD countermeasures. Space-launch activities in Iran and North Korea involve multistage systems that serve to further the development of ballistic missile technology for longer-range systems including intercontinental ballistic missile (ICBM) technologies and systems. As the Director for National Intelligence recently stated, "Iran has demonstrated an ability to launch small satellites, and we grow increasingly concerned that these technical steps . . . provide Tehran with the means and motivation to develop larger space-launch vehicles and longer-range missiles, including an ICBM." In addition to the Taepo Dong 2 SLV/ICBM, North Korea is developing a road-mobile ICBM and an intermediate-range ballistic missile (IRBM) capable of reaching Guam, the Aleutian Islands, and potentially Hawaii. Iran also has steadily increased its ballistic missile force, deploying next generation short- and medium-range ballistic missiles (SRBMs and MRBMs) with increasing accuracy and new submunition payloads. Iran has publicly demonstrated the ability to launch simultaneous salvos of multiple rockets and missiles and openly discussed tests of an anti-ship ballistic missile.

SUPPORT FOR THE WARFIGHTER

Our overriding goal is to provide support to the warfighter. To this end we will increase system reliability, focusing especially on improving the performance of the Ground-Based Interceptors (GBIs) and the Aegis Weapons System, including the Standard Missile (SM) interceptors and continuing our support for operational systems like the AN/TPY-2 radar and the Command, Control, Battle Management and Communications (C2BMC) at fielded sites. We will also deliver more interceptors for Terminal High Altitude Area Defense (THAAD), Aegis Ballistic Missile Defense (BMD), and, pending a successful return to intercept, Ground-based Midcourse Defense (GMD) as we look for ways to make it more operationally effective and cost-effective.

We remain committed to conducting developmental and operationally realistic tests and use a "fly before you buy" approach. MDA continues to work closely with the Director, Operational Test & Evaluation (DOT&E) and collaboratively with independent testers and the Services. We follow an Integrated Master Test Plan (IMTP), a comprehensive, integrated, and cost-effective flight and ground test program that blends developmental testing with tests that employ operationally realistic conditions to demonstrate BMD capabilities against current and projected threats. I have reviewed the DOT&E 2012 Assessment of the BMDS, which identified areas that need improvement, specifically in the areas of BMDS system-level testing and the accreditation of BMDS element models. The report's findings acknowledged our integration accomplishments. We must still work to improve battle management for a fully integrated BMDS. We also agree that we need improved GMD performance models to fully characterize system performance. Similarly, although the report did note our progress in testing against targets with certain SRBM and MRBM characteristics, the acquisition of additional accredited target models will help evaluate the

performance of all phases of regional defense, specifically for the European Phased Adaptive Approach (EPAA).

In order to provide the warfighters confidence in the execution of their integrated air and missile defense plans and the opportunity to refine operational doctrine and tactics, this year we plan to demonstrate the ability of the integrated BMDS to defeat up to three near-simultaneous air and ballistic threats. In the integrated BMDS flight test (FTI-01) this past October, the largest, most complex ballistic missile defense test ever attempted, we demonstrated the capability of the BMDS to engage upon a raid of five near-simultaneous representative threats, air-breathing and ballistic missiles, hitting four out of five targets. In this year's operational BMDS flight test we will use an operationally relevant scenario to demonstrate the integration of regional defense systems. In FTO-01 we will engage two medium-range ballistic missile targets launched within minutes of one another with Aegis BMD and THAAD using Forward Based Mode (FBM) AN/TPY-2 radar and the C2BMC system operated by Soldiers, Sailors, and Airmen. In fiscal year 2014 President's Budget Submission (April 2013) we have added 12 more flight tests to the IMTP, going from 37 tests in IMTP version 12.2 to 49 tests in IMTP version 13.1. As the BMDS matures we need to increase complexity in our flight tests by doing the following: adding system-level operational tests; increasing the number of BMDS assets in those tests; increasing the numbers, types (ballistic and air-breathing) and ranges of the threat representative targets we use and conducting more simultaneous launches; and adding the entire warfighting chain of command to evaluate concepts of operation and tactics, techniques and procedures. We have also increased the number of ground-tests in those planning periods from 88 to 106.

HOMELAND DEFENSE

MDA's highest near-term priority remains the successful GMD intercept flight test of the newest GBI Exo-atmospheric Kill Vehicle (EKV)—the Capability Enhancement (CE)-II EKV. The successful non-intercept controlled flight test of the CE-II GBI earlier this year (CTV-01) gives us confidence and cautious optimism we have addressed the causes of the FTG-06a endgame failure in December 2010 and are on the right track for a successful return to intercept using the redesigned EKV. Based on our analysis of the data from CTV-01, we currently plan to conduct FTG-06b in early fiscal year 2014 to demonstrate the ability of the CE II EKV to discriminate and intercept a lethal object from a representative ICBM target scene. We plan to conduct another intercept test using a two or three-stage GBI and the CE II EKV by the end of fiscal year 2014 (FTG-09).

We plan to conduct the next intercept test of the CE-I EKV (FTG-07) this summer in order to increase warfighter confidence and maintain a testing cadence. We slipped this test from May/June this year to replace corrupted non-tactical telemetry equipment critical to the flight termination system on the interceptor, which is required for range safety. We have made numerous improvements to the CE-I fleet through refurbishments since the last successful CE-I flight test in 2008, and this test will demonstrate the reliability of those refurbished GBIs. I am committed to flight testing the GMD system, at a minimum, once per year; however, I can assure the committee that I will not approve the execution of a flight test unless I believe we are ready. We will work closely with DOT&E to develop scenarios and targets for all of our tests.

We share the Government Accountability Office concern about concurrency in the GMD program and have restructured our GMD return to intercept (RTI) plan and schedule to design and qualify EKV fixes that address root cause of the FTG-06a failure, and confirm the fixes through rigorous ground and flight testing. The original RTI plan accepted significant and excessive concurrency (parallel development, testing and production activities) and the result has been continued slips in the RTI plan. The current baseline RTI plan reduces this concurrency using systems engineering "gated" events that confirm critical components are ready to proceed to testing and production while leaving options open to integrate lower risk components.

Today, 30 operational GBIs protect the United States against a limited ICBM attack from current regional threats, such as North Korea and Iran. Over the past year we have achieved higher operational availability rates with the GMD system, mainly through high levels of redundancy in the GMD Fire Control and communications systems. The currently operational hardened Fort Greely, Alaska (FGA) power plant distributes commercial power and provides generator power during outages. We continued to maintain and improve the GMD guidance system and engagement performance through software upgrades of the CE-I and CE-II EKVs. Last year we completed construction of the 14-silo Missile Field-2 at FGA and emplaced the first GBI in that field in March 2012. We also relocated the last interceptors from Missile

Field-1. This year we will continue with our Enhanced Reliability and Stockpile Reliability Programs to track performance, aging, and reliability metrics, software updates, and technology enhancements for all GMD ground systems.

MDA requests \$1,033.9 million in fiscal year 2014 in Research, Development, Test and Evaluation (RDT&E) funding for GMD to sustain the current system and take steps to address the continued development of ICBMs by countries such as North Korea. In addition to our flight testing activities, we will continue our GMD reliability activities and fleet upgrade program. We are also increasing the number of GBIs we plan to produce and deploy. As announced on March 15 by Secretary Hagel, consistent with the February 2010 Ballistic Missile Defense Review (BMDR), and assuming a successful return to intercept, we plan to increase our operational GBI fleet from 30 to 44 in 2017 by re-allocating GBIs from the spares and stockpile reliability program. We will reset this program with the procurement of 14 additional GBIs, two per year, starting in fiscal year 2016. We also request \$135 million in fiscal year 2014 to rebuild a hardened Missile Field 1 critical to achieving the 44-operational-GBI capability.

In fiscal year 2014 we will continue work on the GBI In-Flight Interceptor Communication System (IFCS) Data Terminal (IDT) at Fort Drum, New York, which we will deliver in early fiscal year 2015 and is planned to be operational in 2015. The East Coast IDT will enable communication with GBIs launched from Fort Greely, Alaska and Vandenberg Air Force Base in California over longer distances and improve defenses for the eastern United States by increasing system performance in specific engagement scenarios.

Pursuant to the fiscal year 2013 National Defense Authorization Act, this year we will begin a siting study for a potential Missile Field in the Continental United States (CONUS). MDA has initiated a CONUS Interceptor Site (CIS) study to evaluate several sites for the potential future deployment of additional GBIs capable of protecting the homeland against threats from nations such as North Korea and Iran. MDA will conduct a siting study this year to inform the President's budget submission for fiscal year 2015. The Environmental Impact Statement will be completed by the first quarter of fiscal year 2016. These efforts would shorten the time to deploy additional GBIs if a future decision to do so were taken.

We are also improving our homeland defense options with the continued development of the two-stage GBI. The two-stage GBI has less burn time than the three-stage version, which allows it to operate within shorter engagement timelines, and will preserve future deployment options.

To maintain readiness in our network of strategic radars, last year MDA worked with the Air Force to begin upgrading the Early Warning Radar (EWR) at Clear, Alaska to give it a missile defense capability, providing improved ballistic missile defense sensor coverage over the continental United States and reducing sustainment and operating costs. For fiscal year 2014 we are requesting \$51 million to continue this work. Along with the Clear EWR contract award, we also exercised a contract option in fiscal year 2013 to upgrade the Cape Cod EWR. The upgraded Clear EWR will be added to the BMDS operational baseline in fiscal year 2017, with the upgraded Cape Cod EWR added in fiscal year 2018. MDA plans to transfer the Beale (California), Fylingdales (United Kingdom), and Thule (Greenland) Upgraded Early Warning Radars to the Air Force in the later part of fiscal year 2013 once all three radars are operating with the same software configuration.

This year we are also working with our Japanese partners to deploy a second AN/TPY-2 radar to the U.S. Pacific Command (PACOM) Area of Responsibility to enhance regional defenses and provide more robust sensor coverage for homeland defense.

We are requesting \$44.5 million in fiscal year 2014 for continued Sea Based X-band (SBX) radar operations. For affordability reasons, MDA transferred the SBX to Limited Test Support Status, where the radar continues to support the BMDS test program and remains available for contingency deployment under the operational command of PACOM. We completed the transfer of the SBX vessel to the U.S. Navy Military Sealift Command in fiscal year 2012. New SBX operational software with improved discrimination and debris mitigation was delivered and completed in January 2013. The new SBX configuration will complete integration fielding and testing with GMD in the third quarter of fiscal year 2014.

REGIONAL DEFENSES

Deployment of regional defenses to protect our deployed forces, allies and international partners remains one of our top priorities. Our fiscal year 2014 budget request funds the continued development and deployment of defenses against SRBMs,

MRBMs, and IRBMs in support of Combatant Commanders' near-term and future priorities.

Terminal High Altitude Area Defense.—MDA delivered the 50th THAAD interceptor last year, completing the initial interceptor load for the two fielded batteries. With the conclusion of unit collective training, MDA also completed fielding of the second THAAD battery. The U.S. Army's granting of Conditional Materiel Release for the THAAD weapon system made THAAD available for worldwide operational employment. In recent tests we demonstrated THAAD's ability to intercept an MRBM as part of an integrated operational test with PAC-3 and Aegis BMD (FTI-01) and its ability to detect, track, and engage multiple simultaneous targets (FTT-12).

In fiscal year 2013 we are delivering the third THAAD battery to the U.S. Army and initiating soldier new equipment training, which will be completed in fiscal year 2014. MDA will continue to deliver THAAD interceptors to inventory, achieving 82 interceptors by the end of this fiscal year and 98 interceptors by the end of fiscal year 2014. For fiscal year 2014, MDA is requesting \$581 million for THAAD procurement, which includes the purchase of 36 THAAD interceptors and six launchers, and two THAAD Tactical Station Groups for the sixth THAAD Battery. In fiscal year 2014 we expect to deliver the fourth THAAD Battery. Our current plans are to deliver six batteries and, based on Combatant Commanders' desires, we are working with the Army to analyze a requirement for a seventh THAAD Battery within the Future Years Defense Program. We also are requesting \$269 million in RDT&E funding in fiscal year 2014 and \$92 million for THAAD operations and maintenance. We will continue to enhance THAAD's ability to operate through post-intercept debris, enable launch of THAAD's interceptors using sensor data provided by other BMDS sensors, and maintain capability against current and evolving threats.

Aegis Ballistic Missile Defense.—Last year we installed the Aegis BMD 3.6 weapon system on three Aegis ships, for a total of 24 Aegis BMD 3.6 ships, and completed two Aegis BMD 4.0 installations. We also commenced two more Aegis BMD 4.0 installs and initiated BMD 5.0 install on the Aegis BMD test ship, the USS *John Paul Jones*, which will replace USS *Lake Erie* in that role. This approach supports Navy and MDA testing of the Integrated Air and Missile Defense combat system. We now have a total of 27 certified Aegis BMD ships. This past year we delivered 11 SM-3 Block IAs and two SM-3 Block IBs, both of which were expended in tests. By the end of 2014, up to 39 SM-3 Block IBs will be delivered. With the Japan Ministry of Defense, we continued SM-3 Block IIA system and component Preliminary Design Reviews and awarded a contract to complete SM-3 IIA development.

In May 2012, we conducted a lethal engagement resulting in the successful intercept of a unitary separating target with the second-generation Aegis BMD 4.0 combat weapon system onboard the USS *Lake Erie* and an SM-3 IB guided missile (FTM-16 Event 2a). This test also validated the resolution of the previous flight test issue. In June 2012, we demonstrated again the ability of the SM-3 IB and the Aegis BMD 4.0 combat system to intercept of a separating ballistic missile target (FTM-18). Just last month we successfully conducted FTM-19 destroying a separating short-range target using the SM-3 Block IB interceptor and the Aegis BMD 4.0.2 weapon system. This was an important operational and developmental test for Aegis BMD that supports the All Up Round production decision for the SM-3 IB. All three intercept tests represented significant accomplishments for the next generation Aegis Weapon System and SM-3 for regional defense and specifically in support of EPAA Phase II. In the integrated FTI-01 BMDS flight test this past October, the USS *Fitzgerald* successfully engaged a low flying cruise missile over water. The Aegis combat system also tracked an SRBM and launched an SM-3 IA against that threat space. Despite indication of a nominal flight of the SM-3 IA, we did not achieve an intercept. We have a Failure Review Board currently investigating why this occurred. We have combed through ground test data from all fleet rounds and have not found any rounds with the same ground test results as the SM-3 IA used in FTI-01, which gives us confidence in all deployed SM-3 IAs. This past February, in FTM-20, we successfully intercepted a unitary MRBM target using the SM-3 IA and the Aegis BMD 4.0 weapon system in a remote engagement using data from the Space Tracking and Surveillance System demonstration (STSS-D) satellites. We passed very high quality fire control quality data provided from STSS-D satellites through C2BMC. This was a highly complex test, and it proved the value of an integrated C2 and sensor network and the use of space-based sensors.

The remainder of this year and next will be busy years for Aegis BMD flight testing as we continue to demonstrate capability of the Aegis BMD 4.0 Weapons System with the Standard Missile Block IB in a series of intercept flight tests. Later this fall, in FTM-21, an Aegis BMD ship will demonstrate a salvo fire capability. FTM-22 will demonstrate the IOT&E of the SM-3 IB against a complex MRBM target.

These two tests will support a full-rate production decision. Tests of the SM-3 IB against various targets from both ships and our first flight testing from Aegis Ashore continue in fiscal year 2014.

In response to the Combatant Commanders' demand signal for more BMD ships with the latest tested capability, Navy and MDA are jointly executing efforts to upgrade Aegis Destroyers with BMD capability, incorporating Aegis BMD into the Navy's Aegis DDG Modernization Program and new construction of Aegis BMD DDGs. In 2014, two previously installed Aegis BMD ships will be upgraded with the 4.0 weapons system configuration. In addition to the ship upgrades, one non-BMD capable ship is programmed to start the Aegis Modernization Program. Construction of DDG 113, the first Aegis Destroyer built from the keel up with the BMD capability, is well underway. Ships identified for homeport transfer to Rota, Spain will have been upgraded or programmed to receive the BMD installation.

We also continue development of a Sea Based Terminal capability to provide protection of maritime forces against advanced anti-ship ballistic missiles and increased layered defense for forces ashore. Using an incremental development approach, we are incorporating BMD capability into the Navy's SM-6 guided missile and the BMD 5.0 weapon system. We expect to test and certify the first increment of Sea Based Terminal capability in 2015 and 2016.

We are requesting \$937 million in RDT&E funding in fiscal year 2014 to continue the development, testing and, installation of Aegis BMD capabilities to defeat longer range and more sophisticated ballistic missiles launched in larger raid sizes. We also request \$581 million in fiscal year 2014 for the procurement of 52 SM-3 IB guided missiles and \$18 million for operations and maintenance of SM-3 IAs. By the end of fiscal year 2014, we plan to deliver a total of 180 SM-3s, including IA and IB variants.

European Phased Adaptive Approach.—We will continue to support the EPAA to provide coverage of European NATO territory from Iranian ballistic missile threats. In 2011 MDA completed Phase 1 of the EPAA to provide coverage of NATO territory in Europe with the deployment of Aegis BMD 3.6 ships with SM-3 IAs and a SPY-1 radar in the Mediterranean, the AN/TPY-2 radar (FBM) to U.S. European Command (EUCOM) in Turkey, and the C2BMC Spiral 6.4 system at Ramstein AFB in Germany. We will continue to invest resources for EPAA development, testing and deployment.

Our goal in EPAA Phase 2 is to provide a robust capability against SRBMs and MRBMs by ensuring the system provides multiple opportunities to engage each threat missile in flight. The architecture includes the deployment of the Aegis BMD 4.0 and 5.0 weapon systems with SM-3 IBs at sea and at an Aegis Ashore site in Romania. In fiscal year 2012 MDA conducted Romania Aegis Ashore planning and environmental studies and began component production necessary for early integration and testing of the Aegis Ashore system by 2015. Aegis Ashore began construction activities in 2012 in Moorestown, New Jersey and construction of a test site in Kauai, Hawaii. We signed an overarching Memorandum of Agreement with the U.S. Navy regarding Operations and Sustainment of the European Aegis Ashore sites. The Aegis Ashore Missile Defense Test Complex at the Pacific Missile Range Facility (PMRF) will support flight testing of Aegis Ashore capabilities in an operational configuration. The complex will be available to conduct the first Aegis Ashore test firing in fiscal year 2014. MDA will initiate construction of the Aegis Ashore site in Deveselu, Romania with the delivery of the deckhouse in fiscal year 2014. The site will be operational by December 2015. MDA requests \$85 million in fiscal year 2014 to continue construction of the Aegis Ashore site in Romania.

In support of EPAA Phase 3, the SM-3 Block IIA, which we are co-developing with the Japanese government and an upgraded version of the Aegis Weapons System are on schedule to be available for deployment in 2018 at Aegis Ashore sites in Romania and Poland and at sea. Deployment of Phase 3 will enhance and expand protection for European NATO countries and U.S. forces through the region from MRBMs and IRBMs from the Middle East. The upgraded Aegis Weapons System combined with the faster, longer reaching SM-3 IIA will provide capability to counter more sophisticated threats when compared to the SM-3 IA and IB and will extend coverage to NATO allies in Europe threatened by longer range ballistic missiles. With the completion of Phase 3, EPAA will provide upper-tier coverage of NATO Europe. As we work closely with Navy in modernization, we will also install the 5.1 Aegis Weapons System on ships for deployment worldwide in support of the Combatant Commanders. We will also install and deploy the 5.1 system in the two Aegis Ashore batteries. This past year we continued development of the Aegis BMD 5.1 fire control system and awarded the SM-3 IIA contract to complete missile development. In fiscal year 2014 we will conduct the first fly-out test of the SM-3 IIA

propulsion stack to measure its performance. MDA requests \$308.5 million in RDT&E funding in fiscal year 2014 to continue the bilateral, cooperative effort.

Command, Control, Battle Management, and Communications and Sensors.—We successfully demonstrated this past year our ability to interoperate between NATO's Active Layered Theater Ballistic Missile Defense (ALTBMD) system and C2BMC. The NATO BMD Operations Center (BMDOC) at Ramstein Air Base is NATO's 24/7 command and control center for missile defense. Today, the NATO BMDOC participates in joint exercises with the EUCOM missile and air defense architecture and is responsible for command and control of the multi-national Patriot units currently deployed in Turkey.

In 2012 we continued to support warfighter operations of the EUCOM BMDS capability for regional defense and executed key warfighter events to demonstrate readiness for defense of Israel by linking the AN/TPY-2 and C2BMC ballistic missile threat tracks to Aegis BMD, THAAD, and Patriot shooters in a distributed environment using operational communications and crews. In partnership with the Combatant Commands, we maintain the capability to engage multiple simultaneous threat attacks in the region. Last year we completed the AN/TPY-2 radar deployment to U.S. Central Command (CENTCOM), where we deployed a C2BMC suite ahead of schedule as well as the Global Engagement Manager (GEM) for control of the AN/TPY-2 radar to enhance regional missile defense.

We request \$300 million in fiscal year 2014 to develop and deploy BMDS sensors, and \$145.8 million to operate and sustain the nine AN/TPY-2 radars and support the UEWRS and Cobra Dane EWR.

We request \$418.4 million in fiscal year 2014 to operate and sustain C2BMC at fielded sites and continue C2BMC program spiral development of software and engineering to incorporate enhanced C2BMC capability into the battle management architecture and promote further interoperability among the BMDS elements, incorporate boost phase tracking, and improve system-level correlation and tracking. We will also continue communications support for the AN/TPY-2 radars and C2BMC upgrades.

We request \$44.9 million for continued operation of the Space Tracking and Surveillance System in fiscal year 2014. In fiscal year 2012, MDA operated STSS demonstration satellites (STSS-D) around the clock with availability exceeding 95 percent as well as the Near Field Infrared Experiment (NFIRE) satellite to collect Earth limb phenomenology. We continue to operate the two STSS-D satellites to conduct cooperative tests with other BMDS elements and demonstrate the capability of the satellites against targets of opportunity to provide high precision, real-time tracking of missiles and midcourse objects that enable closing the fire control loops with BMDS interceptors. We conducted a successful intercept of a threat MRBM last February by Aegis BMD system using only STSS-D data to provide launch data for the SM-3 IA guided missile (FTM-20).

The Department of Defense has terminated the Precision Tracking Space System (PTSS). Concurrency in the development schedule and uncertainty in the cost estimates put in doubt long-term fiscal sustainability. Moreover, the PTSS acquisition strategy was high risk. We believe we need to be in space for infrared (IR) discrimination capability, but for now we can address the threat with other land-based sensors in key locations, which will allow us to provide support to the warfighter in the near term and assume less acquisition risk. A study has been initiated to determine how best to support future sensor requirements and we are exploring technologies to improve the capabilities of ground, air, and space sensors.

DEVELOPING NEW CAPABILITIES

We are developing fiscally sustainable advanced BMD technologies that can be integrated into the BMDS to adapt as threats change. Our investments are focused on technology that brings upgradeable capability to the warfighter. For sensors, in the near-term we will integrate and demonstrate electro-optical and infrared sensors using available airborne UAV platforms to create a precision track our shooters can use . . . For interceptors, our overall strategy includes making near-term investments in interceptor technology that accelerate our ability to use a kill vehicle singularly or in combination in a way that balances our overall approach to solving the very difficult problems of lethal object discrimination, limited inventory and cost per kill. We will also explore other ways to improve the exchange ratio in the missile defense battle.

Last year, we restructured our high power directed energy program and began building the foundation for the next-generation laser system by competing two promising lightweight, highly efficient solid state lasers, one at Lawrence Livermore National Laboratory and the other at MIT Lincoln Laboratory. At MIT Lincoln Lab-

oratory, we built a small-scale prototype of a laser device that exploits a novel technique for combining the output of individual fiber lasers. This year, for the fiber laser, we will team with the Defense Advanced Research Projects Agency to determine the most efficient method of combining laser beams. We will improve the performance of the competing Diode Pumped Alkali Laser System at Lawrence Livermore National Laboratory through a series of laser system upgrades. MDA is requesting \$43.5 million in fiscal year 2014 to demonstrate the efficiency, producibility, and scaling potential of the two candidate lasers.

MDA requests \$77.3 million in fiscal year 2014 to evaluate and research component and sensor technology requirements. Incorporating promising hardware and software from prior programs into our advanced sensor test bed, we will prove the value of emerging discrimination concepts.

Despite the commonality of their mission and functions, components on the current midcourse phase interceptors, the GBI and SM-3 kill vehicles, were developed independently at a substantial cost over the past decade. We are looking at the benefits of developing common kill vehicle technology for the GBI and SM-3 variants, focusing in particular on the ability to address future technology advancements through the development of a similar set of components, subsystems, and software. This common kill vehicle technology effort initially will perform risk reduction and examine other technologies that may improve future interceptor capabilities. This effort is in keeping with the plan for the next generation exo-atmospheric kill vehicle, as directed by section 225 of the fiscal year 2013 National Defense Authorization Act.

Given changes in the assessment of the threat from North Korea to the U.S. homeland, as well as delays in the potential deployment of any SM-3 IIB interceptor resulting from delayed technology development due to budget reductions, the Department is evaluating alternatives to hedge against future threat technology advancements. The Department is no longer planning for the SM-3 IIB program and does not request funding for the program in fiscal year 2014. In addition to the cuts imposed in the fiscal year 2012 Appropriation and fiscal year 2013 funding, analyses show a larger missile would be required to achieve the necessary burn out velocity, and a larger missile design would have taken additional time and resources, pushing the initial operational capability out past 2022. Our near-to-mid-term focus for homeland defense will be to increase GMD capability, to include increasing deployed GBIs from 30 to 44, investing in Common Kill Vehicle technology, and conducting siting and EIS studies for a new U.S. GBI missile field.

MDA requests \$19.2 million in fiscal year 2014 to continue partnerships with industry and universities to seek innovative concepts in sensors, weapons, and advanced algorithms. We will leverage University-to-University International Research opportunities with allied nations to enhance Advanced Technology initiatives and build stronger relationships with our international partners and NATO allies.

INTERNATIONAL COOPERATION

MDA is engaged either bilaterally or multilaterally with nearly two dozen countries and international organizations, such as NATO and the Gulf Cooperation Council.

In Asia-Pacific, the United States and Japan are working together to support the deployment of the second U.S. forward-based AN/TPY-2 radar. In addition, we continue to develop collaboratively the SM-3 IIA to enable U.S. and Japanese Aegis BMD ships to engage MRBMs and IRBMs and, when coupled with the upgraded Aegis BMD weapon system, more sophisticated ballistic missile threats. This year we signed a Second Amendment to the formal joint agreement with Japan administering the SM-3 Block IIA Cooperative Development (SCD) effort. The amendment will reduce risk in the SCD program by adding flight tests and sufficient time in the schedule for additional engineering analysis between flight tests.

This budget continues MDA's longstanding commitment in support of Israeli defensive efforts. MDA is working with the Israel Missile Defense Organization (IMDO) to deliver Iron Dome batteries and interceptors. Iron Dome has had significant success protecting the Israeli population against short-range rockets and large artillery shells. MDA has been working closely with U.S. Department of Defense leadership to ensure U.S. funding for Iron Dome is being used effectively to produce additional Iron Dome batteries and interceptors. Any further U.S. contributions on Iron Dome will be governed by a formal international agreement. MDA is actively seeking Iron Dome co-production opportunities for U.S. defense industry. We are negotiating to obtain available technical data packages and data rights should there be a future U.S. defense requirement for this weapon system.

We are also developing missile defense systems with Israel to address regional ballistic missile threats. The David's Sling Weapon System is designed to defeat SRBM threats. IMDO and MDA completed the first phase of the development of David's Sling last November with a successful intercept test. MDA and Israel also are co-developing the Arrow-3 Upper Tier interceptor. The advanced design of this interceptor was successfully tested this past February in a non-intercept test; a second fly-out test is scheduled for fiscal year 2014. MDA also participated in Austere Challenge 2012 exercises, which successfully demonstrated the concept of operations for the U.S.-Israel BMD architecture and future interoperability.

Elsewhere in the Middle East, U.S. BMD capabilities continue to expand in defense of forward-deployed U.S. armed forces, allies, and partners. Major MDA activities in the Middle East involve relationships with regional partners expressing interest in procuring U.S. systems. Last year, MDA was officially designated as a Foreign Military Sales (FMS) Implementing Agency for THAAD and the AN/TPY-2 radar. In addition to our current \$3.5 billion FMS case with the United Arab Emirates, we are engaged with several other potential FMS customers for these very capable systems.

In Europe, aside from EPAA planning and fielding, MDA maintains active bilateral relationships with our close allies in that region.

CONCLUSION

Mr. Chairman, when I arrived at the Missile Defense Agency last November I was impressed with the organization and the dedication and professionalism of the government and contractor workforce. The Agency is settling into the post-BRAC configuration, which we completed in fiscal year 2011. This has been a challenging period for our personnel, but we have stayed focused on our core mission. I am proud to lead the people behind today's missile defense program. They are highly motivated and the very best in the world at what they do.

The impact of the sequestration on the program and workforce is significant. We will see limitations in our ability to deliver future homeland defense capabilities. To mitigate some of the effects of sequestration cuts, I will be working with the Department to submit an Above Threshold Reprogramming request as part of the Department's larger request this year.

Whatever happens, I am dedicated to executing successful GMD intercept flight tests over the coming year and will continue to strive to ensure reliability in our operational homeland defenses. We have made good progress in our work with our international partners, and I want to continue those important efforts. We will continue our work with the warfighter to develop, test, and field a networked, global BMD system that is flexible, survivable, and affordable. We will work on ways to cut sustainment costs, reduce high-risk acquisition concurrency, improve system reliability, and deliver capabilities as promised. And, mindful that today's security environment is unlikely to mirror that of tomorrow, we will continue to invest in promising and potentially game-changing technology programs to ensure the BMDS will be capable of defeating the complex threats we expect to face in the future.

I look forward to answering the committee's questions. Thank you.

Senator DURBIN. Thanks very much, Admiral.

Philip Coyle, who once ran the Pentagon's weapons-testing program, is currently with the Center for Arms Control. He said in a statement after the last failed test, that the system "is something the United States military and the American people cannot depend upon."

Mr. Coyle said there has been no successful test of the Ground-Based Mid-course Missile Defense system like the one launched in July in 5 years. Pentagon officials acknowledge the interceptors had a mixed record, hitting dummy targets just 50 percent of the time.

Aside from the cost of each test, which was estimated to be, at this point, about \$214 million, let me ask you some questions. Is it not true that these failed tests have taken place in a very controlled and scripted environment? The system operators were privy to significant information about the attack in advance, and even

with that knowledge, 7 of the 15 intercept tests have failed and the system's track record has not improved over time.

FLIGHT TESTING

Admiral SYRING. Sir, we do test in a controlled, scripted environment, based on the amount of time and money each one of these tests costs. That said, we've gone through an extensive review. And I think if Dr. Gilmore were here, he would testify to the threat-realism aspect of our targets that we have flown.

And we stand by the results that we've obtained. We have obtained three now out of four intercepts with the version that we just flew in July. So this was the first failure of what we call the CE-I EKV. And our goal is to find out what happened and to get back to flight testing as soon as possible.

I would differ in terms of our confidence level with the system. And certainly, the war fighters will chime in and testify to that in the upcoming months.

We handle and will handle in the future reliability failures, such as the one we saw, through shot doctrine. And the current shot doctrine that the Combatant Command's (COCOM) employ would have handled this failure. And that said, we cannot stop testing. We must continue to test. We cannot wait another 4½ to 5 years to test again.

And, as submitted, my budget request in 2014 is requesting two GMD flight tests in fiscal year 2014.

Senator DURBIN. Let me ask you just a few specific questions. Is it true or not that the GMD system has not been tested against an intercontinental range missile, and no plans for such tests have been scheduled until 2015, at the earliest?

INTERCONTINENTAL BALLISTIC MISSILE TESTING

Admiral SYRING. Sir, it has not been tested against an intercontinental ballistic missile (ICBM). It's been tested against long-range intermediate-range ballistic missiles (IRBM), which is the next class down. We're in the process of manufacturing a target for ICBM testing to begin in 2015. And between now and 2020, there's eight scheduled ICBM intercept tests.

Senator DURBIN. Has the system ever been tested against a tumbling warhead?

Admiral SYRING. Sir, in a classified environment, I'd be happy to answer that.

Senator DURBIN. Let me ask you this: Of the 30 deployed GMD interceptors, it has been reported that half include obsolete parts, although an additional 10 have been taken off operational status because of a known design flaw.

GROUND-BASED INTERCEPTOR OBSOLESCENCE TO UPGRADES

Admiral SYRING. We've gone through an extensive upgrade period of the oldest interceptors that were fielded in the early 2000s. The test that we just flew was a CE-I upgrade, which was the upgraded EKV that had not been flight tested. So it was important for us to flight test that.

I won't stipulate the number due to classification, but there are a number of GBIs that are available to the war fighter but in a lesser readiness condition but still usable by the war fighter.

Senator DURBIN. So, Admiral, it comes down to this: Since President Reagan announced this concept 30 years ago, and we started making rather substantial investments, there are still serious questions as to whether or not we have a missile defense system that can protect America against threats that we believe could be coming our way from Iran, North Korea, or other enemies of our country.

This committee and Congress are being asked by some to expand the amount of money we spend on the systems at a time when testing has not proven that these systems are effective. What is your belief? Is this the time to invest more money in the deployment of these systems?

GROUND-BASED INTERCEPTOR TESTING

Admiral SYRING. The time, sir, is to continue the test and to continue to finish the developments that are underway. And we're budgeted properly to do that. I won't say that additional money won't be required. The budget, as it's currently structured, has adequate funding to complete the development of the CE-II, to test the CE-II, to complete the upgrades to the CE-I fleet. And I remain confident that America is defended today with the readiness of our system.

Senator DURBIN. How can you say that you're confident that America can be defended if we've never tested our system against an intercontinental ballistic missile?

GROUND-BASED INTERCEPTOR CAPABILITY AGAINST INTERCONTINENTAL BALLISTIC MISSILE

Admiral SYRING. Sir, we have extensive modeling and simulation capability that projects the results of our conducted intercept testing into the longer range environment. Speed and distance are important, and as we have a target that is available for intercept testing starting in 2015, we will actually demonstrate that. But our models and simulation and ground testing that we have done indicate that we would be successful.

Senator DURBIN. I'm told by my staff that you are unique in that you may be the first from the Navy to be in charge of this particular ground-based missile defense. We discussed briefly before this hearing the Aegis missile and our reliance on it and its proven capability.

Could you compare the Aegis missile defense system that we currently deploy to the ground missile defense system in terms of its reliability?

AEGIS VERSUS GROUND-BASED MID-COURSE DEFENSE RELIABILITY

Admiral SYRING. Sir, the Aegis system was designed in a much different environment than the current system that we have for GMD. The Aegis system—the GMD—as you're aware, sir, was, and the GBIs currently fielded were fielded very quickly to meet a growing threat. And that served a very, very good purpose.

The Aegis system was designed early on, once we decided to go down that path, in a very systematic systems-engineered approach. And I think we see the results of that. It was always our intent, or the program's intent, from what I understand, historically, was to incrementally improve the GBI system over time. And that's what we're doing.

The Aegis system, sir, has been extremely successful. The hit-to-kill technology and the hit-to-kill theory, I think, has been proven over and over again, and as it has in GMD, as well. I would just say that the two programs were stood up in a much different rate in a much different timeframe.

Senator DURBIN. That's the point I'd like to get to. You've dedicated a major part of your military career to acquisitions. What you've described to us is an Aegis system, which was developed in a certain way, in comparison to a ground missile defense system developed in another way. The net outcome is the Aegis system is reliable, and we count on it to protect our Nation. The ground missile defense system has not reached and not produced that level of confidence.

What mistakes were made with the ground missile defense system development that you believe led to this contrast?

PROBLEM WITH SCHEDULE DRIVEN ACQUISITIONS

Admiral SYRING. Sir, I would just—I would characterize it more as the schedule-driven pressure to get interceptors in the ground to counter the threat. And the decision to field what were prototypes was made, and made for good reason, with the theory and the program structured after that to go and prove these interceptors, which is what we've been doing. That was what borne the CE-II program, and that was what will borne the common kill vehicle program, which we've requested in the 2014 budget.

Senator DURBIN. So it seems to me, if I can restate that as I heard it, that the deployment schedule was so demanding that there was deployment before development, deployment before proven test when it came to ground missile defense. And that was not the case when it came to Aegis.

Admiral SYRING. I would agree with that, sir.

DEVELOPMENT AND PRODUCTION

Senator DURBIN. We run into this repeatedly, whether we're talking about the F-35 or others. Keep producing, even while you're testing. We've reached a point now where we're making some critical budget decisions and may not be able to afford that luxury.

What troubles me is this is a system that still hasn't been proven to be able to protect America and the notion of spending additional billions of dollars at this moment in time. I can understand our goal. It's a worthy one, to protect our Nation. But spending more on weapons that are not proven I don't believe meets the President's test of weapons both proven and cost effective.

Thank you, Admiral.

Let me turn it over to Senator Shelby.

Senator SHELBY. Admiral, let's go back to the recent test and the failure. Do you believe that the architecture of the whole system is sound in itself?

Admiral SYRING. Yes, sir. And we proved that in the last test.

Senator SHELBY. Absolutely. If you can get into it some here. And if I ask a question and you can't, you'll tell us.

Admiral SYRING. Yes, sir.

Senator SHELBY. We might need a classified hearing on this.

Was there a mishap dealing with the missile itself?

Admiral SYRING. I'm sorry, sir. What was the word?

Senator SHELBY. The missile. In other words, what was the failure? Where did the failure come from at this juncture? I know you're still analyzing everything.

Admiral SYRING. What we can say publicly is that the EKV, the kill vehicle, did not separate from the third-stage booster.

Senator SHELBY. Okay. So it was not the power train? You know, it wasn't the missile?

Admiral SYRING. It wasn't the booster, sir.

Senator SHELBY. Booster.

Admiral SYRING. And it wasn't the guidance system. The EKV did not separate.

Senator SHELBY. Do you think you can correct that?

Admiral SYRING. Absolutely. Yes, sir. We've seen separation issues in previous flight tests before the CE-I, early on in the prototype testing. And those have been corrected. And we'll find out what happened here, and we'll correct this as well.

Senator SHELBY. The chairman talked about the cost, and this is the appropriations subcommittee on defense. We're interested in costs. We're also interested in defending this country. Don't you need more tests, rather than fewer tests?

Admiral SYRING. Yes, sir.

Senator SHELBY. The more tests, the more you learn, the more technology evolves in anything, whether it's a truck, or a tank, or a submarine, or a missile, or a missile to defend against a missile attack. Don't you need more tests, basically?

ADDITIONAL TESTING

Admiral SYRING. Yes, sir. We do need more tests. And I've requested in the 2014 budget two intercept tests and at least one intercept test in subsequent years.

Senator SHELBY. I realize that the missile defense has been an evolving concept to reality and so forth, and it will continue to do that. What are your biggest challenges in the future as we look around the world? I'm speaking generically. Is it better technology, ways to evade defense, or what is it? Are there many? Or that should be in another form?

THREAT

Admiral SYRING. If I may, it's a combination of many factors. The threat is continuing to proliferate. The threat is becoming more sophisticated in both numbers and capability. It's important that we stay ahead of the threat, as we are today. And the way we do that, and let me break it down into two separate areas: Regional defense and homeland defense.

Homeland defense, I would say our biggest challenge near term and then continued testing and proving the technology over the next 10 years is reliability of the GBI, reliability of the overall sys-

tem. Flying before we buy any more, which we're committed to, and continuing that commitment.

That said, we need to start to change the cost calculus and the cost curve. We can't just keep building bigger interceptors and more interceptors. And that is what we'll get into, some of the advanced technology work that we're pursuing, some of which I can't talk about here today and would be happy to in a classified environment.

Continued partnership with our allies in the regional areas over in Europe, over in the Pacific, and over in the gulf region. And we've had extensive agreements that we have in all three areas that are panning out. And we must continue to pursue partnerships in terms of defense of not just the homeland, but defense of our regional allies and our forces ashore.

Senator SHELBY. Admiral, the Department has proposed to terminate what we call the Precision Tracking Space System (PTSS) due to concerns over concurrency and the development schedule, uncertainty, and of course, in the cost estimates. How will MDA backfill lost capability for tracking and discrimination if the termination goes through?

PRECISION TRACKING SPACE SYSTEM TERMINATION

Admiral SYRING. We did have serious concerns with the concurrent acquisition strategy of PTSS and the costs to get there. We said when we terminated, when the announcement was made to terminate that program, that we would be pursuing more terrestrial-based sensors, meaning ground sensors. And you've heard me talk about the need for more radars and more discriminating radars.

Senator SHELBY. Okay. On March 15, Secretary Hagel announced that the U.S. will deploy 14 of these additional ground-based interceptors in Fort Greely, Alaska. That's about a 50-percent increase. Would you clarify how the timeline for the emplacement of these additional interceptors would be and how this current strategy will impact the per-cost unit of each interceptor in the near term?

Admiral SYRING. Yes, sir.

Senator SHELBY. And is that important?

Admiral SYRING. Yes, sir. The strategy to get to 44 by 2017, by 2017, is a reallocation of missiles that are currently in the production flow under the old contract and the new contract. Completing those missiles, once we have a successful CE-II intercept test in March, is the "Fly Before You Buy." We must complete that intercept test to release these missiles for final integration.

And what you'll see is, as those are finished, we will populate the remaining silos that exist. And we'll undertake starting, or actually starting this summer, the Missile Field 1 refurbishment.

So it's a combination of a reallocation, completing what's on contract, successfully flying, and demonstrating in our intercept tests before we do any of it.

We have requested, and as part of the strategy that was announced on March 15, that we would begin to buy interceptors in 2016. And I think you'll see us come back in future budgets on more economical and better ways to buy those.

Senator SHELBY. Does the President's 2014 budget request provide adequate funding to ensure the additional 14 ground-based interceptors we'll produce and field by 2017, per the Secretary of Defense guidance?

Admiral SYRING. Yes, sir.

Senator SHELBY. Okay. My last question, Mr. Chairman, would be in dealing with the Iron Dome, which we all know. And while I understand that MDA may not have an immediate requirement for the Iron Dome system, I'd be interested in future opportunities, if there are some, in co-production of this system in the United States should the need for an Iron Dome materialize.

Could you provide us an update, update to the subcommittee, on where negotiations currently stand with Israel to obtain the technical data packages for this system?

Admiral SYRING. Sir, we have had extensive discussions with the Israelis, Israel Missile Defense Organization (IMDO) in particular, four meetings recently. We are making progress. We're not there yet, frankly. And we are actively negotiating and striving for a significant percentage of work share in the United States for that system.

Senator SHELBY. Thank you, Mr. Chairman.

Senator DURBIN. Senator Cochran.

Senator COCHRAN. Admiral, we appreciate your cooperation with our committee and your appearance here today. But especially, we appreciate your leadership in helping make sure we're doing what we need to do to protect ourselves against missile attack and to take advantage of emerging technologies so that we utilize those and deploy those as soon as reasonably possible, given the constraints of budget and practicality.

These are sometimes vague and immeasurable and imprecise decisions that have to be made. And we appreciate your leadership and your team and the devotion and commitment that you are making to making the right decisions and helping to recommend the right decisions by our Government.

The recent announcement to deploy some operational ground-based interceptors is, I assume, due to advancing and more sophisticated threats that we face. Are the funds that are being requested for appropriation by the Congress now in this budget request going to be sufficient to help us move as quickly and as completely sound in terms of operational capability as the money will allow us?

Admiral SYRING. I'm confident of that, sir. We appreciate your committee's support on the above threshold reprogramming request. It helped us through the sequestration cut in 2013. And as the budget is currently structured in 2014 and requested, I'm confident that we can meet that need.

Senator COCHRAN. Would you comment on the Cobra Judy platform, if that's something that you can discuss in open session with us? Specifically, about the enhanced capability that this may provide to the missile defense agency? Is this something that you are looking at acquiring and will need to have funds appropriated to support?

COBRA JUDY

Admiral SYRING. The Cobra Judy shipping capability, the radars that are on that ship are fantastic radars, as you know. And I'm looking, sir, at all options in terms of where we can either reuse radars in a better way for discrimination capability or potentially build a new radar in the future. It will be one of the platforms that we look at. Yes, sir.

SEA-BASED OPTION FOR HOMELAND DEFENSE

Senator COCHRAN. Thank you. You've indicated that you have under review some sites for a third land-based missile defense system. And I wonder whether or not a sea-based option is included in that review. I wonder about your assessment of that and whether evaluating this is an approach to enhancing specifically East Coast defense capability as a part of that equation.

Admiral SYRING. Yes, sir. As Chairman Dempsey has testified, that will be one of the capabilities that will be evaluated. The Aegis system, as you know, is a fantastic system. We would have to get into a classified discussion in terms of what coverage and what capability that could provide in defense of the homeland, which I'd rather not go into here in an unclassified setting. But, yes, sir, it will be a capability that we examine in conjunction with examining the third site.

TERMINAL HIGH-ALTITUDE AREA DEFENSE BATTERIES

Senator COCHRAN. Every time I see the acronym THAAD, it makes me wonder: What am I doing in this question here?

But I notice that there's an extra A in the missile acronym.

Senator DURBIN. You're moonlighting.

Senator COCHRAN. "Moonlighting," he says.

But I'm just curious. There's been a decision, I suppose, made about the number of THAAD batteries. And that's been reduced, as I understand it, from nine to six in fiscal year 2013. To your knowledge, is the Department reevaluating that need for increasing the number of batteries? And what is your assessment about how effective that system is?

Admiral SYRING. I'll take the second part of the question first. The system is very effective, extremely effective since the system was redesigned back in the mid-2000s. The track record is 10 for 10 in terms of hit-to-kill intercept testing.

The requirement is nine. For budget reasons, we cut that to six during the last budget submission. I am working hard as the new director with the Army to find a way to the seventh and possibly eighth battery. The system is needed, and the system is needed more in number, in my assessment, in discussion with the combatant commanders.

Senator COCHRAN. Thank you very much for your testimony and for your leadership. Again, we appreciate your service.

Admiral SYRING. Thank you, sir.

Senator DURBIN. Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chair. And, Admiral, welcome, and thank you for the conversations that we have had re-

cently to discuss missile defense and, more specifically in Alaska, what's happening up in Greely.

I would like to just state at the outset that I'm confident in our systems. I appreciate your leadership there at MDA. Recognize that we have had successful tests, CE-I tests, in the past. I think you and I would agree that it helps to have additional testing. It helps, too, to keep on testing. Is that correct?

ADDITIONAL GROUND-BASED INTERCEPTORS TESTING

Admiral SYRING. Yes, ma'am, I 100 percent agree.

Senator MURKOWSKI. As you know, I was in Greely at the beginning of May, had an opportunity to go through the field there. And this is obviously not my first time. I have been through on many, many occasions. But I have been pleased to see the build-out, the proposal that we have with Missile Field 1 there. It was absolutely my view that it was shortsighted by the Administration with the previous decommissioning of Missile Field 1 there at Greely.

I look at this, and particularly in view of what we see with increasing threats coming out of North Korea, Iran, my concern is that we not leave Greely at less than full capacity and capability. What more can we do at Fort Greely to provide the best missile defense to protect our Nation?

NORTH KOREA THREAT

Admiral SYRING. Yes, ma'am. The first step is for us to complete on schedule the Missile Field 1 refurbishment and to get those silos ready for the additional GBIs that we're going to buy.

There would be growth possibilities beyond that if we decided to go beyond 44. Forty-four, though, gives us a roughly 50 percent increase in terms of defense of our homeland against a ballistic missile attack. So completing the testing, completing the missile field, modifications, being ready for the reload of that field up to 44 is of paramount importance to our strategy.

Senator MURKOWSKI. And you are comfortable with the schedule that we're on to fill that out?

Admiral SYRING. Yes, ma'am. And there will be contracts released this summer to begin that work.

Senator MURKOWSKI. There are future cost savings, I think, if we were to improve Missile Field 1 to 11 or 20 silos now instead of 6. Would you agree that by increasing the funds by a relatively low amount now that we would increase efficiencies and allow for greater benefits in the long run?

Admiral SYRING. Yes, ma'am. There would be benefit to that if the threat situation dictated.

Senator MURKOWSKI. Where would you say that you would invest your next dollars in order to achieve that persistence coverage for the United States we are all looking for? Where do you spend your money next?

Admiral SYRING. I would spend our next dollar on discriminating sensors, meaning radars, big radars west and east, to give us the capability where I see the threat going in the next 5 to 10 years.

Senator MURKOWSKI. And as you say, okay, those are your first dollars. How does this then track with the plans and the scheduled build-out at Fort Greely?

Admiral SYRING. The premise, the fundamental tenet of the strategy to go to 44 was the escalation of the threat from North Korea as the most near-term issue the United States faces. And going to 44 by 2017 keeps us ahead of that threat in terms of numbers and capacity.

We need to take the additional step of discriminating sensors as the threat moves beyond just numbers, but also sophistication to help counter that escalation. And my view is that the 44 is important. The 44 addresses what we see with North Korea today. Discriminating sensors are going to be equally important. And then what you'll see is the Department evaluate the need and the requirement to go beyond 44 as we start to evaluate the threat from Iran and other nations like that.

Senator MURKOWSKI. So you view these as on parallel tracks? So we're working to build out on the radar side, as well, at the same time, concurrently then, as we are addressing all of our issues at Greely?

DISCRIMINATING SENSORS

Admiral SYRING. Yes, ma'am. You'll see us down the 44 path in a serious nature, in a serious way. You'll see us study, and we've done some studies already with the combatant commander, on discriminating sensors and where those might be and what they might look like. And then the pre-work that's going on with the CONUS interceptor site study that I'm doing this year and the Environmental Impact Statement (EIS) that will follow to keep these three things in parallel.

Senator MURKOWSKI. Okay. And you may have addressed this already. But can you speak to the timeline of the flight testing and return to flight for our newer missiles?

Admiral SYRING. Yes, ma'am. The newest missile will be flight tested in March 2014, intercept tested. And as you know, we've had two failures of that missile. We understand what the problem is. Through ground testing, we're confident that it's been completed and adequately addressed, and we look forward to the intercept test.

Senator MURKOWSKI. Thank you.

Admiral SYRING. And that remains on schedule.

Senator MURKOWSKI. Are we testing now as we would in a war fight?

Admiral SYRING. We are testing in a way that is representative of a trajectory or a threat missile that would come from a country such as North Korea. The last test that we did was very similar to that in terms of speed and altitude. And it was actually the longest-range intercept test that we have tried.

So we're continuing to progress up that curve. But the question that I received from the chairman earlier is, it is necessary, based on the cost of these tests, to have our best engineers there to script the test, understand what those timelines are so that we get the maximum engineering value from the test. I'm confident that the war fighters, if asked, could employ the system seamlessly.

Senator MURKOWSKI. Good. Thank you. Thank you, Mr. Chairman. Thank you, Admiral.

Senator DURBIN. Thank you, Senator Murkowski.

Senator Collins.

Senator COLLINS. Thank you, Mr. Chairman.

Admiral, I know that you've already answered a number of questions on the unsuccessful test, which came as a surprise to us. I know a review board has been established, which will help us better understand it. From what I've read, it doesn't seem to be an indictment of the ground-based interceptor system as a whole, but rather a more narrow issue. Would you generally agree with that, based on what you know so far?

Admiral SYRING. Yes, ma'am. Every part of the system worked as designed up to the failure of the EKV to separate.

Senator COLLINS. Thank you. Admiral, a 2012 report by the National Research Council concluded that there are gaps in our Nation's ballistic missile defense system, particularly when it comes to protecting the East Coast. Alaska is going to be fine. But Maine, there is a real gap.

The report highlighted a location in Maine as one of two possible sites for an additional missile interceptor field. In your written testimony, you stated that MDA has begun to evaluate several candidate sites in anticipation of conducting an EIS for an additional ground-based interceptor site within the United States. And we've discussed this in my office as well.

Could you provide the subcommittee this morning with an update on where you are in this review process? And are you still looking at the two sites identified in the National Research Council report, as well as other sites?

CONUS SITE

Admiral SYRING. Ma'am, thank you for the question. I'll answer the second part first. Yes, we are looking at the two sites in Maine, in conjunction with other sites as well.

We are in the process of—screening is a good word for it—screening all of the sites that we have looked at in detail, down to a number that will then result in us going to ask, first any Government entities in the area, for additional information, and then eventually for us to go onsite to several of these places before the end of the year to do site surveys.

My plan is within the next 2 to 3 weeks, once we've gotten the approval through the building of the sites that have been screened for the criteria of wanting further information, needing further information in terms of viable contenders, there's many factors that go into that, as you know, Senator, with safety, location, system effectiveness, the geographic location, base infrastructure, land infrastructure. There's a whole series of criteria that I've used.

But what we'll do is, we will notify the Congress before we go public with any of those selections. And once we do that and brief the staff members, we will go ask the sites for more information. We will then take that information and study it for another few weeks and then send people to the sites that have the most promise.

It's a very serious effort that is backed up with thousands of pages of documentation and analysis. It is not haphazard.

Senator COLLINS. I know that you will do a thorough review. And in addition to the criteria that you mentioned, I also would encour-

age you to look at local support and acceptance for the site. I know in my State of Maine, it is a very welcoming place for military installations of this sort. In fact, I've sent several letters from local groups that endorse the site being located in northern Maine at the site of the former Loring Air Force Base.

But I think that's a very important part of this review process. Locating the site in an area where it is not welcomed by the population I don't think would be wise. So in addition to all of those extremely important technical issues, I hope that you will consider that factor as well.

PUBLIC SUPPORT FACTOR

Admiral SYRING. Ma'am, we do consider that factor, and that will be a factor in the decision.

Senator COLLINS. Thank you.

Separate from the discussion regarding an additional interceptor site, would an additional radar site on the East Coast increase our early-warning capabilities regarding threats emanating from the Middle East?

Admiral SYRING. Yes, ma'am. An additional radar would help us with the discrimination problem and threat that we see in the future.

Senator COLLINS. And that is what you seem to be saying in response to Senator Murkowski's question, as well.

Now, I understand that your plan is for the environmental impact study for the potential third interceptor site to be accomplished in fiscal year 2014. Do you have funding included in the budget request to conduct that study? I know EISs are expensive, as well as the fact that they take a long time.

Admiral SYRING. No, ma'am. There's not money in the budget request currently. We'll be working with the Congress on methods to address that shortfall.

Senator COLLINS. Admiral, both President Bush and President Obama have recognized the advantages of an additional missile defense site for more effective defense against long-range ballistic missile threats.

You have looked very carefully at this issue. Could you give us your evaluation since 2002 and 2009, when the two different presidents made policy decisions in this area? Has the ballistic missile threat from our potential adversaries grown, stayed the same, decreased? What's your assessment of the threat?

Admiral SYRING. Ma'am, I'll answer it in the context of being a consumer of intelligence. And I'll let the intelligence experts talk about that in more detail in a classified setting. But I will say that, as the strategy that was announced by the Secretary is the key point of the threat has advanced. And North Korea has made strides. The Taepo Dong-2 launch in December meant something. And we must be able to address that.

And the 44 GBIs in Fort Greely will enable us to stay ahead of that threat as we see it develop. And we'll be constantly evaluating where we need to be in terms of sensors and discrimination and potentially more GBIs beyond the 44.

Senator COLLINS. Thank you. Let me just end, Admiral, by thanking you for your leadership of this very important agency.

You took over a troubled agency that had some personnel and morale issues, and from everything I've seen, you've really turned the agency around. And I commend you for your leadership.

Admiral SYRING. Thank you, ma'am. As I sign off every update to the Agency, it's an honor to serve with each one of them. And I've been in the Navy 28 years, and it's by far the most professional and dedicated workforce I've ever had the chance to work with.

Senator COLLINS. That is great to hear, because the mission is a really important one.

Thank you, Mr. Chairman.

Senator DURBIN. Thank you, Senator Collins.

I asked the staff: How much have we spent on missile defense since President Reagan said this was a national goal? Their estimate is \$150 billion. It's been 5 years since we've had a successful intercept test—5 years. And all the conversation from the administration, and at this table today, has been about how we should continue to spend more for silos in Alaska, for the placement of ground missile defense on the East Coast, and so forth.

I'm trying to reconcile the appetite of Congress to keep spending more money with the actual results of testing. I want this country to be safe, and I believe if we had a ground missile defense system that worked, we would be a safer Nation, period.

Can you reconcile two things that you have said here? First, "Fly Before You Buy." I think I understand that to basically say, "We're not going to buy something until it's proven that it works." And secondly, the notion that we're committing ourselves to 14 more interceptors in a year or two, when we haven't really flown. We're buying before we fly. We haven't really proven that these interceptors can work. How do you reconcile that?

FLY BEFORE YOU BUY

Admiral SYRING. Sir, I'll answer it in two ways. The interceptor that we're going to buy after we fly is the newest interceptor that addresses many of the legacy and rapid fielding issues that were in the design of the prototypes that were fielded in the 2000s.

The CE-II was the program and the upgrade that we intended to pursue and did pursue after we fielded the GBIs very, very quickly.

The CE-II intercept failure, sir, that we've seen, the new ones, have been in the very late end game of the intercepts, meaning that everything up to that point worked. The booster worked; the updates worked; the ballistic missile defense system gave it the track. Everything worked.

What we're talking about is a very delicate system in the end game that, frankly, we did not see until the flight test. The first failure was a quality issue. It wasn't a technology issue. It was a lock wire. The second issue is only observed through the first actual flight test after that failure when we saw it in the end game. We understand what happened. We've been able to replicate it in the ground test.

So I'm talking about a very small component of the overall interceptor, the inertial measurement unit (IMU). And through ground testing, we're confident that in the flight test it will work. Again, both of those intercepts, all the way up to the point of failure, did

everything they needed to do. It's case in point, if you just consider the first failure, though, sir, of the importance of producibility, of quality control, of everything that is endemic in the manufacture of an interceptor. And those processes have been improved greatly over the last 4 or 5 years.

So, that said, and I said this before, Mr. Chairman, the hit-to-kill technology I'm confident of. We've proven it not just in this program, but other programs. It's a matter of getting to a producible, repeatable, quality-controlled design and manufacture of an interceptor.

Senator DURBIN. So is it fair, I want these tests to be successful. We've invested a lot of money. If this works, we're a safer Nation. So, I'm not starting hoping for the worst; I'm hoping for the best. And I like your confident feel that, you know, the day is coming soon when we have a successful test.

But is it fair for us in this role, in the Appropriations Committee, to say we're going to stand by "Fly Before You Buy" before we make a commitment to 14 more interceptors or an expansion of the ground missile defense system, we're going to wait for that successful test to prove that this is money well spent?

Admiral SYRING. You should demand that, sir.

Senator DURBIN. Thank you. Let me ask you this question: If the threats are Iran and North Korea, and we are currently testing long-range missiles, are either of those countries capable of launching long-range missiles, not ICBMs, that would be a threat to the territory of the United States?

Admiral SYRING. I'm just hesitating a little because of the classification.

Senator DURBIN. If you can't answer it in open session, I understand.

Admiral SYRING. The important point, and it's in the open intelligence, is that they've never yet flight-tested that long-range capability. But the Taepo Dong-2 launch, again as I stated, means something in terms of the ability of getting a payload into space successfully. So, although the threat missiles haven't been tested at that range, the technology, I think, took a step with the demonstration of that flight.

We must continue to monitor that, sir, and not count that it won't be successful. We must plan that it will be successful. And we must be able to maintain our defense of the country.

Senator DURBIN. Do you know the cost of the 14 interceptors the administration is asking for?

Admiral SYRING. The budget in terms of the out-year budget projection is \$75 million per interceptor.

Senator DURBIN. Per interceptor. Thank you.

Senator Cochran.

Senator COCHRAN. Thank you very much for your cooperation with our committee. And I think the questions and the answers have helped us understand better what the testing program is doing and producing and contributing to our future security. Thanks for your service.

Admiral SYRING. Thank you, sir.

Senator DURBIN. Senator Shelby.

Senator SHELBY. Mr. Chairman, I think a classified hearing would be in order here because we'll probably learn a lot more in the hearing. I wish you would consider getting this into a closed session. Would you do that?

Senator DURBIN. Sure.

Senator SHELBY. I think it's very important. Thank you.

Senator DURBIN. Senator Murkowski.

Senator MURKOWSKI. I would just repeat the request of my colleague here. I, too, would appreciate the opportunity to learn more in a closed setting.

Senator DURBIN. We can certainly do that, if it's okay with the ranking Republican.

Senator SHELBY. It is.

ADDITIONAL COMMITTEE QUESTIONS

Senator DURBIN. So we'll follow through with that. And thank you for your cooperation. If there are no further questions from the panel, I want to thank Admiral Syring for his testimony today. We may send you some written questions, and I hope you'll get a chance to respond to them in a timely way.

[The following questions were not asked at the hearing, but were submitted to the Department for response subsequent to the hearing:]

QUESTIONS SUBMITTED BY SENATOR DIANNE FEINSTEIN

SOLID DIVERT AND ATTITUDE CONTROL SYSTEM INDUSTRIAL BASE

Question. With the cancellation of the SM-3 IIB Program, the Missile Defense Agency intends to continue development of next generation kill vehicle technologies including key components such as solid Divert and Attitude Control Systems (DACS) to enable long-duration missions. The industrial base for this critical component is comprised of only two providers. Each provider offers a unique technological approach to expand the capabilities of next generation kill vehicles.

What is MDA's plan to invest in technology development by both solid DACS providers? How will this investment plan promote the health of the industrial base and mature burgeoning solid DACS technologies for competitive development and procurement of next generation systems?

Answer. The Agency is funding both Alliant Techsystems and Aerojet in fiscal year 2013. Alliant Techsystems is investigating and maturing light weight, long mission duration SDACS technology. Aerojet is developing more capable SDACS for the SM-3 IB and SM-3 IIA development programs.

The fiscal year 2014 President's budget request provides the necessary funding to sustain the solid DACS industrial base for another year. We are working with the Department and other agencies to promote a strong industrial base for defense related technologies.

ISRAEL

Question. What is the status of the technical data rights sharing between the U.S. and Israel for the Iron Dome system. What is the status of beginning co-production with U.S. defense firms?

Answer. The Missile Defense Agency (MDA) and the Israel Missile Defense Organization (IMDO) are negotiating an international agreement related to production of Iron Dome for Israeli protection, including co-production by U.S. firms; we expect to conclude/sign the agreement this fall.

Regarding technical data rights and technical data packages (TDPs), the above agreement will also require the IMDO to give MDA the TDPs they have. In addition, the IMDO and MDA will jointly study cost, schedule and intellectual property impacts to acquire the necessary TDPs/data rights to build the system in the United States in its entirety. The DOD currently lacks a Iron Dome requirement for U.S. defense needs. The study could inform a future decision.

INCREASED GROUND-BASED MID-COURSE DEFENSE IN ALASKA

Question. Adm. Syring, how will the recent test failure of the CE-I “kill vehicle” (KV) affect the decision to deploy 14 additional CE-II KVs by 2017? Has the test failure affected the timeline for the CE-II test?

Answer. The recent test failure of the CE-I “kill vehicle” does not affect the decision to deploy 14 additional CE-II KVs by fiscal year 2017. MDA will achieve complete confidence in the Ground-Based Interceptor (GBI) designs before fielding the additional 14 GBIs. On July 5, 2013, MDA conducted Flight Test GBI (FTG)-07 using a legacy Capability Enhancement (CE)-I Exoatmospheric Kill Vehicle (EKV). The GBI successfully launched, but the target was not intercepted. MDA initiated a Failure Review Board (FRB) to determine the root cause of the failure. In parallel with the FTG-07 FRB, MDA will verify there is separation (the absence of potential common flaw) to ensure the cause of the FTG-07 failure is not present in the CE-II GBIs.

MDA is continuing its Return to Intercept (RTI) program by conducting extensive ground testing of the CE-II EKV to ensure the root causes of the FTG-06a flight test failure have been corrected and to qualify its design. If CE-I/CE-II separation is established, MDA (with COCOM and Pentagon consideration) will plan to execute FTG-06b as currently scheduled for March-May 2014. If MDA cannot establish separation, the FTG-06b flight test date will depend on the progress and results of the FTG-07 FRB. Successful completion of the flight test, coupled with extensive ground test results, will allow resumption of planned CE-II GBI deliveries for operational use.

Additionally, MDA is currently developing a CE-II Block I design that will incorporate enhancements to improve performance and reliability. MDA will conduct extensive modeling and simulation and ground testing to fully qualify the CE-II Block I design. MDA will then demonstrate the CE-II Block I EKV in an intercept flight test scheduled for fiscal year 2016. The successful completion of ground and flight testing of the legacy CE-II and CE-II Block I designs will provide complete confidence in the fielded CE-II fleet and for the deployment of additional interceptors required to achieve 44 operational GBIs by the end of fiscal year 2017.

If MDA cannot establish design separation, or if the FTG-07 (CE-I) failure review board indicates the root cause could be present in the CE-II design, the CE-II flight test timeline could be affected.

[This document contains information that may be exempt from mandatory disclosure under the Freedom of Information Act.]

Question. Please tell me how many and what types of tests will be required before the Pentagon makes a decision to deploy the 14 additional interceptors in Alaska. Is one successful intercept test enough? Is there a requirement that the system be tested against realistic countermeasures and decoys before deployment?

Answer. MDA will achieve complete confidence in the Ground-Based Interceptor (GBI) designs before fielding the additional 14 GBIs. On July 5, 2013, MDA conducted Flight Test GBI (FTG)-07 using a legacy Capability Enhancement (CE)-I Exoatmospheric Kill Vehicle (EKV). The GBI successfully launched, but the target was not intercepted. MDA initiated a Failure Review Board (FRB) to determine the root cause of the failure. In parallel with the FTG-07 FRB, MDA will verify there is design separation (the absence of potential common flaw) to ensure the cause of the FTG-07 failure is not present in the CE-II GBIs.

Yes, a successful intercept flight test, coupled with extensive ground test results, of the CE-II GBI is required before deployment of the 14 additional interceptors in Alaska. MDA is continuing its Return to Intercept (RTI) program by conducting extensive ground testing of the CE-II EKV to ensure the root causes of the FTG-06a flight test failure have been corrected and to qualify its design. If CE-I/CE-II design separation (the absence of a common flaw) is established, MDA (with COCOM and Pentagon consideration) will plan to execute FTG-06b as currently scheduled for March-May 2014. If MDA cannot establish design separation, the FTG-06b flight test date will depend on the progress and results of the FTG-07 FRB.

Yes, GMD Ground and Flight Test scenarios, that support GMD deployment decisions, are designed to include realistic countermeasures and decoys as required by the Ballistic Missile Defense System Specification and the Adversary Data Package threat suite. The successful completion of ground and flight testing of the legacy CE-II and new CE-II Block I designs will provide confidence in the fielded CE-II fleet and for the deployment of additional interceptors required to achieve 44 operational GBIs by the end of fiscal year 2017.

[This document contains information that may be exempt from mandatory disclosure under the Freedom of Information Act.]

Question. What is the current cost of a CE-II kill vehicle? How much will it cost to modify the CE-II kill vehicles already deployed on interceptors?

Answer. The current cost of a Capability Enhancement (CE)-II Block I kill vehicle in the Development and Sustainment Contract is \$32.6 million.

The current cost estimate to modify each CE-II Exoatmospheric Kill Vehicle is approximately \$18 million. The \$18 million estimate is based on a fix consisting of replacing the current hard-mount Inertial Measurement Unit (IMU) containing version 0 firmware with a cradled IMU containing version 10 firmware. It also includes installation of the new EKV second locking feature, EKV sunshade knife edge adapter, Stage 1 and 2 nozzle closures, Stage 2 and 3 Thrust Vector Control Electronics Control Units, and as necessary, Divert Attitude Control System tanks, and frangible rails and rings. This effort includes de-emplacement, reverse flow and testing, forward flow and testing, emplacement and checkout.

Question. Please provide a breakdown of the costs for the planned deployment of the 14 additional Ground-Based Interceptors.

Answer. [FOUO] The total cost estimate to refurbish Missile Field-1 (MF-1) and purchase 14 GBIs is \$1,356 million then year (TY) dollars. The cost breakdown follows:

- [FOUO] The President's budget 2014 (PB 2014) provides \$224 million TY to upgrade MF-1 and construct a new mechanical electrical building. In fiscal year 2014, the funding is divided: \$82 million Military Construction and \$53 million Research, Development, Test and Evaluation (RDT&E). In fiscal year 2015 and fiscal year 2016, RDT&E.

- [FOUO] PB 2014 provides \$459 million TY for procurement and emplacement of six additional GBIs. Extrapolating PB14 funding through fiscal year 2022, 14 GBIs would cost \$1,132 million.

[This document contains information that may be exempt from mandatory disclosure under the Freedom of Information Act.]

GROUND-BASED MID-COURSE DEFENSE (GENERAL)

Question. The Missile Defense Agency has stated that the Ground-Based Mid-course system is sufficient to address current North Korean and Iranian ballistic missile threats. The 1999 National Intelligence Estimate (NIE) stated that Iran and North Korea could develop countermeasures by the time they flight test their ballistic missiles. Does the MDA include countermeasures using technologies like those the NIE discussed when making this assessment?

Answer. [Deleted.]

Question. The 2012 National Research Council (NRC) report comparing boost-phase ballistic missile defense to other approaches identified six fundamental precepts of a cost-effective ballistic missile defense. It found, "... the current GMD system deficient with respect to all of these principles." Because of these problems, the NRC recommended an entirely new ground-based missile defense, or GMD, system, with new interceptors, radars, and concept of operations. This criticism was not restricted to the failure of the CE-II kill vehicle, yet you have testified that a successful intercept test of the CE-II is all that is required before moving ahead with buying 14 more interceptors. Why is the administration recommending the purchase of 14 more ground-based interceptors, or GBIs, when the NRC found the current system so lacking?

Answer. The National Research Council put forth many ideas, some of which are currently being pursued as part of the GMD Program of Record. Others, while sound in concept, require more refinement or research to be practical. For all of these ideas, deploying any of them is many years away. We continue to have confidence in the basic design of the GMD weapon system. Our flight testing consistently demonstrates the multiple elements of the Ballistic Missile Defense System (BMDS) do work together reliably as intended. The GMD failures experienced recently with the CE-II version of the Exo-Atmospheric Kill Vehicle (EKV) (FTG-06/FTG-06a) did not show fundamental problems with the concept. These tests revealed issues under stressing conditions that required flight testing to identify. The learning that comes from these failures is the purpose of developmental flight testing and ultimately leads to a more robust and reliable system. On the strength of the confidence in the overall BMDS, the Secretary of Defense determined the best near-term strategy to address imminent adversary developments is acquiring 14 more current configuration GBIs in the near term. As the NRC noted in their Major Finding 6, the GMD can be effective as designed against the current limited threats, but requires continued evolution to meet the emerging adversary threats. MDA has mid- to long-term plans to evolve the EKV to meet these threats through the Phase 3 Common Kill Vehicle Technology design now under study, as well as imple-

menting other improvements in other elements of the BMDS. We will continue to evaluate improvements to the GMD system as recommended in the NRC report.

TESTING

Question. What is the range of parameters included in GBI and Aegis BMD tests to make the tests realistic? For each system, have they included:

- a tumbling warhead or missile;
- countermeasures such as chaff, booster fragmentation, or mylar balloons coupled with anti-simulation of the warhead;
- use of a cooled shroud around the warhead;
- use of radar absorbing material on the warhead;
- multiple warheads or missiles;
- inclement weather conditions;
- tests against ICBM-range targets;
- tests without knowing in advance the exact time of the target missile launch;
- tests without knowing in advance the exact size and shape of the target;
- a range of lighting conditions.

For each of the scenarios above, if a test has not been performed, when is such a test planned? Will the upcoming test of the CE-II kill vehicle include any of these parameters?

Answer. [Deleted.]

Question. The MDA claims that launch on remote capability was demonstrated in two missile defense tests, FTM-15 using the AN/TPY-2 radar and FTM-20 using the STSS satellite as remote sensors. The Flight Test fact sheets state that each interceptor launch was based on the association of the remote sensor data with the launch of either an intermediate or medium range missile. Only with the ability of the system to “launch on remote” is the European Phased Adaptive Approach system able to cover a large area. Without this capability, defended areas shrink to small regions around the interceptor sites, as explained by the Defense Science Board report on Early Intercept. In either test list above did any part of the defense system have advance knowledge of the nature or trajectory of its target? Did the Aegis BMD launch the SM-3 interceptor based solely on AN/TPY-2 data acquired during the FTM-15 test? Was the Aegis BMD able to launch the SM-3 interceptor based only on STSS-D satellite data acquired during the FTM-20 test?

Answer. FTM-15 was an operational test of the EPAA Phase I architecture; participants did not have advanced knowledge of the nature or trajectory of the target. Warfighters operating the Ballistic Missile Defense System used the system’s tactical mission planning capabilities to define sensor coverages and doctrine settings. The operators were provided intelligence and warning orders about the threat only defined as potential launch areas and defended areas. Readiness posture of the system was determined by threat warnings provided by Pacific Command and Navy’s 3rd Fleet. Target launch time was not known by the operators.

FTM-20 was an experiment vice an operational test; participants did have advanced knowledge of the target as the test used developmental test architecture. FTM-20 demonstrated technical capability of space sensors, specifically the Space Tracking Surveillance System (STSS), to acquire and track a ballistic missile target and provide fire control quality track data to launch the SM-3 guided missile. Target trajectory was provided to operators of STSS and to Sailors onboard the ship. Target launch time was known to all participants.

In FTM-15, the Aegis BMD 3.6 Weapon System calculated a fire control solution and launched the SM-3 Block IA guided missile based solely on AN/TPY-2 sensor data. The ship’s SPY radar acquired the target in flight after the SM-3 launch. Combining initial data provided by the off-board sensor and the ship’s SPY radar data, the Aegis BMD Weapons System completed closure of the fire control calculation during the SM-3’s flight to consummate the intercept.

The Aegis BMD was able to launch the SM-3 guided missile based only on STSS-D satellite data acquired during the FTM-20 test. In FTM-20 the Aegis BMD 4.0 Weapon System calculated a fire control solution and launched the SM-3 Block IA guided missile based solely on STSS sensor data. The ship’s SPY radar acquired the target in flight after the SM-3 launch. Combining initial data provided by the off-board sensor and the ship’s SPY radar data, the Aegis BMD Weapons System completed closure of the fire control calculation during the SM-3’s flight to consummate the intercept.

Question. In a written response to a question from a 2012 hearing, J. Michael Gilmore, the Director of Operational Test and Evaluation stated that: “This was the case in Flight Test Ground-Based Interceptor (GBI)-02 (FTG-02). Although the flight test objectives excluded actually killing the incoming RV, the EKV achieved

a “glancing blow” on the RV. Subsequent analysis indicated the “glancing blow” would not have resulted in a kill. I score the FTG-02 flight test as a hit, but not a kill.” Does the MDA classify FTG-02 as a successful intercept? How is such an assessment consistent with Dr. Gilmore’s assessment? When exactly was the determination made that only a “glancing blow” had been achieved?

Answer. **[FOUO]** The MDA analysis agrees with Dr. Gilmore’s assessment and classifies FTG-02 as a hit and not a kill. At the same time MDA classifies FTG-02 as a successful intercept. Intercept success is not determined solely by hit or kill status; it is determined by resulting viability of the RV. In this case, even though the GBI Exoatmospheric Kill Vehicle (EKV) did not kill the target, the EKV damaged it enough for aero thermal demise (e.g., the RV burned up in the atmosphere). The determination occurred during FTG-02 post flight analysis, which took place between September 2006 and May 2007.

SENSORS

Question. In testimony before Congress last year, then-MDA director Lt. General Patrick O’Reilly stated that: “The greatest future enhancement for both homeland and regional defense in the next 10 years is the development of the Precision Tracking Space System (PTSS) satellites.” The administration recently cancelled the PTSS. What particular capabilities would PTSS have provided that the current system lacks? What systems or plans does the MDA have to compensate for the lack of PTSS-sourced data?

Answer. The DOD terminated the PTSS program in April 2013.¹ A GAO report on PTSS² indicated that the DOD had considered canceling the program in November 2012 based upon a study of PTSS by OSD Cost Assessment and Program Evaluation (CAPE) initiated in 2011. Conclusions drawn in this study were outlined in a May 2013 report delivered to congressional defense committees and it is from this report that the rationale for program cancellation was outlined.³ The CAPE found risks in the proposed material solution and the execution plans summarized in three general areas:

1. Technical risk

- The orbit of the PTSS constellation through the Van Allen radiation belts posed a hazard to the satellite components, potentially degrading the sensor assuming worst case scenarios.
- Industry did not currently manufacture focal plane arrays in the desired wavebands in the size required by PTSS satellites.

2. Acquisition risk

- To support timely deployment, the decision to commit to industry contracts occurred before all technical risks on the development program were retired.
- The primary member of the Lab development team, JHU/APL, had limited experience developing operational DOD space systems.
- The transition from a Lab development program to a commercial production program added programmatic risk and potential developmental redundancy.

3. Cost risk

- MDA estimates of program life cycle costs were deemed optimistic for this early stage of the design.

The warfighter, in a shift of focus from regional conflict to the defense of North America, also noted the PTSS constellation—fine tuned for regional conflicts—lacked performance for homeland defense.

PTSS was designed to be an agile, infrared space sensor that continuously tracked ballistic missile objects after boost, increased raid capacity, characterized objects in the threat cloud and was capable against mobile and emerging threats. Operating from space, PTSS could track missiles flying over 80 percent of the Earth’s surface, could peer into large countries outside of harm’s reach of offensive weapons, and required no transit into theater. PTSS track data would be available to any missile defense weapon system connected to the Ballistic Missile Defense System (BMDS) fire control network.

PTSS would have provided improved capabilities to the BMDS. It was designed to:

¹Dr. Ashton Carter, “Resource Management Decisions for the FY 2014 Budget Request,” 10 April 2013, pg. 41.

²Christina Chaplain, “Missile Defense: Precision Tracking Space System Evaluation of Alternatives,” report GAO-13-747R, 25 July 2013.

³Richard Burke, “Independent Cost Estimate for Missile Defense Agency Precision Tracking Space System,” 8 April 2013.

- Provide persistent and simultaneous access to adversary launch sites distributed across the Earth's surface.
 - Deliver fire control quality tracks early in the trajectories of homeland and regional threats, enabling over the horizon launch-on-remote (LoR) and engage-on-remote (EoR) targeting and—timelines permitting—shoot-assess-shoot tactics.
 - Receive tracking to provide high frame rate, multi-spectral optical data in support of BMDS discrimination and kill assessment functions.
- PTSS operated from space in order to provide persistent sensor coverage of known and emerging threats to:
- Relieve global competition for scarce terrestrial sensor resources.
 - Handle cooperative adversaries separated by global distances launching simultaneously, or to track launching out of surprise locations.
 - Provide sensor support during crises and developing regional conflicts when forces are not yet established.
 - Compensate for terrestrial outages due to maintenance down time or adversary attacks to suppress defenses.
- There are other ways of implementing PTSS functions and features in the near term because (1) adversaries are few and geographically localized, (2) attack corridors are known, (3) indications and warning are reliably available, and (4) the terrestrial sensor force structure could be enhanced. For example:
- Existing and programmed overhead persistent infrared (OPIR) sensor capabilities could be extended in some situations to achieve LoR track quality and to support the BMDS kill assessment function.
 - High powered long range discriminating radars, properly positioned, can effectively perform the midcourse discrimination task, although the combination of optical and radar adds significant robustness.
 - Interceptor kill vehicle sensing capability could be improved to better discriminate threat objects and more effectively conduct the engagement.
 - High altitude airborne IR platforms might be deployed in hot spots to develop early fire control quality tracks and to provide BMDS discrimination inputs with high resolution, multispectral data.
- All investment options are currently under review by MDA as potential means to compensate for the lack of PTSS-sourced data.

QUESTIONS SUBMITTED BY SENATOR DANIEL COATS

Question. How can MDA take advantage of unique university experimental facilities in propulsion, prognostics, hypersonics, cyber security and advanced system-of-systems, battle-management modeling and simulation to enhance missile system reliability and to develop the MDA human talent for future system success?

Answer. The Missile Defense Agency (MDA) has an active university outreach effort that includes:

- Campus visits from the MDA Director and top level MDA management.
- Development of a university consortium focused on “Innovative Propulsion Technology Support”.
- “Campus Champion” program that teams MDA Leaders with specific universities to develop strategic long term relationships with academic institutions.
- Development of a “University Programs Playbook” handout used to help university researchers understand the needs of MDA and the process to submit research proposals.
- University colloquiums to address the depth and breadth of research capabilities at U.S. universities.

The MDA university engagement policy encompasses a holistic approach involving research; educational opportunities; career development; and science, technology, engineering, and mathematics activities.

- Benefits to our university partners include:
 - Awareness of challenging research topics for missile defense.
 - Access to a source of funding for continuing research.
 - Shaping curricula to better prepare students for careers in missile defense.
 - Real world experience through sponsored sabbaticals and summer intern programs.
- Benefits to MDA from these partnerships include:
 - Access to cutting-edge research and facilities and a pool of nationally recognized scholars.
 - Exposing the Nation's brightest students to the intellectual challenges a missile defense career offers.

- Influencing the engineering curricula to better prepare the future missile defense workforce.
- Bringing a new perspective to solving some of the most difficult missile defense-related problems.

The MDA recently sponsored a colloquium with one of our university partners, Purdue University with presentations at Redstone Arsenal. Topics included:

- Propulsion/combustion stability.
- Agent-based command, control, battle management and communications architecture.
- Cyber security.
- Reliability and producibility.

In regards to the specific technology areas referenced in Senator Coat's question, the MDA has the following active university research efforts:

Propulsion:

- Purdue University: "Propulsion Improvements for MDA Applications"*.—The research provides greater understanding of the phenomenology involved with hypergolic thrusters and combustion instability in to improve future Divert Attitude Control System (DACS) divert thrusters. The goal is to provide capability to withstand or prevent injector failures in an exo-atmospheric simulated environment without modifications to duty cycles or thrusters.
- Texas A&M: "Solid Propellant Additives for DACS Applications"*.—The research will demonstrate and develop the use of additives for a tailored burning rate and extinguishable propellant.
- Texas A&M: "Ignition of Composite Propellants with Advanced Additives"*.—The research will characterize and modify as needed the ignition behavior of the propellant formulation to demonstrate the required attributes for a DACS mission.
- University of Alabama Huntsville: "Green Oxidizer Development"*.—The research will explore a series of oxidizer content organic chemicals tailored to meet decomposition demands either through a heterogeneous or homogeneous catalytic approach.

Battle Management Modeling and Simulation/Cyber Security:

- Auburn University: "Radar Signal Processing for Multi-Sensor Tracking of Multiple Targets"*.—The research will focus on the development of a multi-sensor tracker to provide tracks (state estimates) of the multiple targets in the surveillance region.
- Purdue University: "An Agent-based Concept for an Enhanced (C2BMC) Architecture"*.—The research will develop and test a two-tiered, agent based Command and Control, Battle Management and Communications (C2BMC) architecture concept that links the best mix of sensors and weapons in optimal communication and command topologies.
- Purdue University*.—The MDA is a member of The Center for Education and Research in Information Assurance and Security (CERIAS) located at Purdue University.
- University of Connecticut: "Innovative Radar Signal Processing & Algorithms, Decision Systems, Sensor Fusion, System Tracks, & Correlation Ambiguity"*.—The research will focus on forming tracks from disparate sensors, as well as similar; extracting boost phase information for subsequent system utility. This approach addresses new requirements for the system to enable persistent tracking and optimize efficiency.
- University of Illinois: "Intelligent and Robust Control for Optimal Engagement Planning"*.—This research focuses on the problem of engaging a ballistic missile or its warhead and is formulated as an optimal control problem. The trajectory from launch to terminal phase is considered. Terminal guidance is assumed to be provided conventionally, with a feedback controller.

Reliability:

- University of Connecticut: "Development of Innovative Solutions of Hardware Security and Detection and Prevention of Counterfeit Electronic Components"*.—The research will address the security and reliability of integrated circuits. Focusing on the development of methodologies and tools for counterfeit integrated circuits (IC) detection and prevention, supply chain risk management (SCRM), detection and prevention of hardware Trojans, and reliable IC design.

The MDA has no current university research efforts in the areas of Hypersonics and Prognostics.

The MDA pursues research opportunities with the Nation's universities through Broad Agency Announcements posted on the FedBizOps website twice a year. Research topics are derived from the mission and needs of the Ballistic Missile Defense System.

【This document contains information that may be exempt from mandatory disclosure under the Freedom of Information Act.】

Question. How can MDA work together with the industrial and university sectors to create a defense technology/product development pipeline to accelerate technology and products to market to meet MDA system future needs?

Answer. The Missile Defense Agency (MDA) has an active university outreach effort that includes:

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Question. What new programs will be required to further develop and attract the essential MDA human talent base so that MDA may administer and develop the leading edge solutions to missile reliability?

Answer. The Missile Defense Agency (MDA) does not require new programs. MDA already has in place several programs that develop and attract essential MDA human talent.

In fiscal year 2013, MDA partnered with the Naval Postgraduate School to further develop our engineering workforce in Systems Engineering and Reliability. MDA sponsored a 1-year graduate level certification program in systems engineering to approximately 30 employees. Four courses were offered focusing on systems engineering and reliability, and participants attended each class as a cohort. In fiscal year 2014, MDA will partner with the Naval Postgraduate School for a certificate program and a Systems Engineering Masters Degree program. The certificate program consists of four courses in 1 year in systems engineering. The Masters Degree program leverages the fiscal year 2013 class by adding 12 courses conducted 1 per quarter over a 3-year period. The intent is to continue this partnership subject to funding and needs of the agency.

In addition to the above, the MDA leverages existing Federal human resource flexibilities and benefits. Below are examples of Government Flexibilities utilized at MDA:

- Department of Defense Civilian Acquisition Workforce Personnel Demonstration Project (AcqDemo).
- Provides flexibilities to hire, set pay, reassign, and rate employees based on their contributions.
- Expedited Hiring Authority for Acquisition Positions in accordance with subsection 1705(h) of Title 10, U.S.C., as amended by section 833 of the NDAA fiscal year 2009.
- Recruitment, Relocation, and Retention Incentives (as appropriate).
- Student Loan Repayment (as appropriate).
- Creditable Service for Annual Leave Accrual for Non-Federal Work Experience and Experience in the Uniformed Service (as appropriate).
- Telework.
- Wellness Programs.
- Federal Employees Health Benefits (FEHB).

- Supplemental Dental and Vision Insurance (FEDVIP).
- Federal Employees Group Life Insurance (FEGLI).
- Thrift Savings Plan (TSP).
- All Flexible Spending Accounts (FSA).
- Long Term Care Insurance (LTC).
- Civil Service Retirement System (CSRS).
- Federal Employees Retirement System (FERS).
- Alternate Work Schedule (AWS) Program:
 - Flexible Work Schedule (FWS).
 - a fixed work schedule with daily start and end times different from the MDA regular work schedule.
 - Compressed Work Schedule (CWS).
 - a fixed schedule enabling a full-time employee to work 80 hours per bi-weekly pay period on fewer than 10 workdays.

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Question. With NATO members formally endorsing territorial missile defense and welcoming the European Phased Adaptive Approach (EPAA) at the November 2010 Lisbon Summit, what are the next steps to continue “NATO-izing” the EPAA, and what do you see as the key milestones and challenges ahead? What impact or role does the EPAA play in NATO?

Answer. NATO is developing the Active Layered Theater Ballistic Missile Defense (ALTBMD) program with NATO common funding. ALTBMd is the command and control backbone for NATO missile defense capability. Interim capability is deployed and operational.

NATO is progressing on developing the next increment of ALTBMd/NATO BMD capability. The Missile Defense Agency has worked closely with NATO in the past to ensure interoperability of U.S. and NATO command and control systems. We will continue to work with NATO as they continue to develop ALTBMd capability.

Phases 1 through 3 of EPAA are the U.S. contribution to NATO’s missile defense capability. Several allies have announced potential missile defense national asset contributions to this capability, while others are considering missile defense upgrades or acquisitions.

Question. Please describe any specific initiatives planned for the upcoming year regarding international missile defense cooperation, particularly in the Middle East and East Asia.

Answer. The Missile Defense Agency (MDA) is engaged either bilaterally or multilaterally with over 20 countries and international organizations, such as the Gulf Cooperation Council.

In Asia-Pacific, the United States and Japan are working together to support the deployment of the second U.S. forward-based AN/TPY-2 radar. In addition, we continue to collaborate on developing Standard Missile-3 (SM-3) Block IIA to enable U.S. and Japanese Aegis Ballistic Missile Defense (BMD) ships to engage medium- and intermediate-range ballistic missile threats and, when coupled with the upgraded Aegis BMD weapon system, more sophisticated ballistic missile threats. Last year, we signed a second amendment to the formal joint agreement with Japan administering the SM-3 Block IIA Cooperative Development (SCD) effort. The amendment will reduce risk in the SCD program by adding flight tests and sufficient time in the schedule for additional engineering analysis between tests.

The fiscal year (FY) 2014 budget continues MDA’s longstanding commitment to support Israeli defensive efforts. We are working with the Israel Missile Defense Organization (IMDO) to deliver Iron Dome batteries and interceptors. Iron Dome has had significant success protecting Israel against short-range rockets and large artillery shells. We have been working closely with Department of Defense leadership to ensure U.S. funding for Iron Dome is being used effectively to produce additional batteries and interceptors. For fiscal year 2013 and beyond, the U.S. contributions to Iron Dome will be governed by a formal international agreement. We are actively seeking Iron Dome co-production opportunities for U.S. defense industry.

We are also developing missile defense systems with Israel to address regional ballistic missile threats. The David’s Sling Weapon System is designed to defeat short range ballistic missile threats. IMDO and MDA completed the first phase of the development of David’s Sling last November with a successful intercept test. The MDA and Israel are also co-developing the Arrow-3 Upper Tier interceptor. The advanced design of this interceptor was successfully tested this past February in a non-intercept test, and a second fly-out test is scheduled for fiscal year 2014. We also participated in AUSTERE CHALLENGE 2012 exercises, which successfully demonstrated the concept of operations for the U.S.-Israel BMD architecture and future interoperability.

Elsewhere in the Middle East, U.S. BMD capabilities continue to expand in defense of forward-deployed U.S. armed forces, allies, and partners. Major MDA activities in the Middle East involve relationships with regional partners expressing interest in procuring U.S. systems. Last year, MDA was officially designated as a foreign military sales (FMS) implementing agency for THAAD and the AN/TPY-2 radar. In addition to our current \$4.9 billion FMS case with the United Arab Emirates for THAAD batteries and interceptors, we are engaged with several other potential FMS customers for these very capable systems.

Question. Is the United States planning any missile defense cooperation with India? If not, why not?

Answer. The Missile Defense Agency is not currently engaged in missile defense discussions with India. I defer specific questions on U.S.-India discussions to the Under Secretary of Defense for Policy.

Question. What plans do you have on utilizing expertise inherent with the Naval Warfare Centers like NSWC Crane to help reduce program risk?

Answer. The Missile Defense Agency (MDA) uses Naval Air and Surface Warfare Centers as partners in the development and support of Aegis BMD, and plans to continue these partnerships in the future. The Naval Air and Surface Warfare Center enterprise contributes broadly across a wide range of functional areas, as delineated in the attachment, including program risk reduction.

In fiscal year 2013, approximately \$186 million was authorized for Naval Air and Surface Warfare Centers to directly support MDA programs.

PROGRAM SUPPORT FROM NAVAL AIR AND SURFACE WARFARE CENTERS TO AEGIS BMD

Naval Surface Warfare Center (NSWC) Crane

- System Integrity Engineering Support
 - Review and assessment of quality and feasibility of employment of system integrity initiatives
 - Identification of potential technology improvement of system integrity
- Parts, Materials and Processes Mission Assurance Plan
 - Risk identification, Assessment and Analysis
 - Contractor Compliance
 - Plan Implementation
- SM-3 Missile Technical Support
 - Battery Engineering
 - System Safety
 - Failure Investigations
 - Storage
- Technical Support, In-Service and Acquisition Engineering
 - Sensors, Electronics, Electronic Warfare and Special Warfare Systems

NSWC Carderrock

- Fleet Hull, Mechanical and Electrical (HM&E) Engineering
 - Verifies configuration of power (failure/interruption) transfer systems
 - Provides logistics and sustainment for the HM&E mods
 - Vertical Launch System (VLS) heating and cooling systems
- Fleet ship survivability and damage control engineering
- Materials Engineering for Standard Missile (SM)-3 specialty propulsion system components

Naval Air Warfare Center (NAWC) China Lake

- Propulsion Engineering and Test Support
 - SM-3 Propulsion Analysis
 - Risk Assessment
- Missile Component Engineering Support
 - System Safety

NSWC Corona

- Independent Analysis and Assessment
 - Conducts Measurement Efforts
 - Scientific Research and Development Analysis
 - Develops and Verifies Metrology and Calibration Procedures
- Threat Engineering
- Mission Assurance Impact Assessment

NSWC Dahlgren—Aegis Weapon System Computer Program Lifetime Support Engineering

- Computer program maintenance

- Independent testing in parallel with system development
- Functional Area Assessments to identify computer program defects
- Independent Navy Performance Verification testing after program delivery
- Vertical Launch System Engineering
- Ship Integration Support
- Aegis BMD Combat System
- Configuration Management

NSWC Indian Head—Packaging, Handling, Shipping and Transportation of Munitions Support

- Manufacturing Technology
- Weapons Containers
- Ordnance Handling Equipment
- SM-3 Domestic Transportation
- Energetics Testing and Certification Support
- SM-3 Pyrotechnic Energetic Device Certification Process
- Insensitive Munitions Support
- Research and Development of Explosives and Propellants
- SM-3 Insensitive Ballistic Barrier System

NSWC Port Hueneme—Aegis Weapon System In-Service Engineering

- In-service support and maintenance of equipment
- Joint Assessment of Maintenance conducted during system development and test
- At-sea testing shipboard assessment of equipment operation and maintenance
- Logistics Support
- Systems/Elements Under Test Support

PROGRAM SUPPORT FROM NAVAL AIR AND SURFACE WARFARE CENTERS TO TARGETS AND COUNTERMEASURES

Naval Surface Warfare Center (NSWC) Crane

- Trident (C-4) Motors Static Fire
- Trident (C-4) Motors Aging and Surveillance
- Performed an independent assessment of Lithium-Ion batteries to determine safety on eMRBM target system and the aircraft transporting the missile

Naval Air Warfare Center (NAWC) China Lake

- Refurbish, maintain and modify existing or new Ground Handling Equipment (GHE) or flight hardware used to transport, store or test assets of the Targets and Countermeasure Program

NSWC Dahlgren

- Provides Hazards of Electromagnetic Radiation to Ordnance (HERO) susceptibility analysis/assessment for air certification for air launch and ground transportation
- Assist with Spectrum Supportability—Requests for Frequency Allocations through the spectrum approval process

NSWC Port Hueneme, White Sands Attachment

- Procure target hardware/software
- Integrate and test Aegis Readiness Assessment Vehicles (ARAV) and similar targets
- Provide launch services and range operations for the targets
- Conduct and consolidate pre & post-flight analysis
- Conduct failure review boards for any target flight anomalies

NSWC Point Mugu

- Participates in individual working group functions including items that are PMRF local-range issues
- Represents and speak for NAWC in review boards for test problems, test failure resolution, and other items for which range approval is needed led by the contractor on an as-needed basis
- Attend test design planning, mission planning, and milestone meetings on an as-needed basis

PROGRAM SUPPORT FROM NAVAL AIR AND SURFACE WARFARE CENTERS TO QUALITY ASSURANCE

NSWC Crane

Electronic parts reliability

- Develops requirements and policy to support Ballistic Missile Defense System (BMDS) level performance, reliability, part screening and qualification requirements, part packaging analyses, part obsolescence forecasting
- Expertise in radiation hardening technology, Trusted and Secure Electronics, and Stockpile reliability
- Developed and maintains BMDS As-Designed Parts and Materials List, which includes attributes for safety and mission critical parts and materials
- Management of MDA Mission Assurance Advisory Program (gathers data on Lessons Learned, and conducts research and analysis on issues related to electronic part reliability)
- Member of Parts, Material and Processes Boards that approve standardization, selection, qualification and acceptance of electronic parts
- Assesses electronic part failures and concurrence with root causes and corrective actions
- Conducts battery research, analyses, testing and qualification
- Assesses safety and risk of battery technologies proposed by MDA contractors

Anti-Tamper (AT)

- Expertise in technology assessments of memory components, Field Programmable Gate Arrays and sensors
- Supports Small Business Innovative Research efforts (Topic Team Lead, Topic Author, Technical Monitor for 48 contracts, outreach to MDA Prime Contractors)

Counterfeit Part Detection

- Serves as agency Lead for Counterfeit Parts risk reduction program
- Provides technical expertise in defining agency policy and requirements for counterfeit parts, detection and avoidance
- Performs on-site assessments of Unauthorized Distributors
- Provides counterfeit part detection training to MDA and its contractors
- Performs counterfeit part detection testing at the Failure Analysis Lab

Additional NSWC Crane Support

- Supports agency level contractor compliance audits
- Commercial-Off-The-Shelf (COTS) assemblies
- Printed Circuit Board Technology
- Power systems analyses

Question. What expertise has NSWC Crane provided to the Missile Defense Agency in the areas of electronic parts reliability, anti-tamper, and counterfeit parts detection? What are your unfunded priorities in the areas of electronic parts reliability, anti-tamper, and counterfeit parts detection?

Answer. NSWC Crane contributes broadly across a wide range of functional areas including Parts, Materials, and Processes (PMP) engineering support to the Missile Defense Agency (MDA) Parts and Materials Engineering Division of the Quality, Safety and Mission Assurance Directorate and anti-tamper support to the MDA Engineering Directorate.

NSWC Crane has provided electronic parts reliability expertise in the following areas:

- PMP requirements and policy development to support the Ballistic Missile Defense System (BMDS) level performance and reliability
- Electronic electrical and electromechanical part screening and qualification requirements
- Electronic part packaging analyses
- Electronic part obsolescence forecasting
- Radiation hardening technology
- Development and maintenance of the BMDS As-Designed Parts and Materials List, which includes attributes for the majority of safety and mission critical parts and materials.
- Management of the MDA Mission Assurance Advisory Program, which captures critical data on lessons learned, and research and analysis on emerging issues related to electronic part reliability.
- Trusted and secure electronics

- Parts Engineering support of agency and individual MDA programs' PMP Boards that approve standardization, selection, qualification and acceptance of electronic parts
- Parts Engineering assessments of electronic part failures and concurrence with root cause and corrective actions

NSWC Crane has provided anti-tamper expertise in the following areas:

- Anti-tamper coordinator and anti-tamper technology development roles for MDA
- Anti-tamper technology assessments of memory components, focal plane gate arrays, and sensors
- Subject matter expert support of anti-tamper plan development for MDA programs
- MDA anti-tamper Small Business Research support: topic team lead, topic author, technical monitor for 48 contracts, outreach to MDA prime contractors.

NSWC Crane has provided counterfeit part detection in the following areas:

- Serve as Agency lead for the Counterfeit Parts Risk Reduction Program
- Provide technical expertise in defining agency policy and requirements for counterfeit parts detection and avoidance
- Perform on-site assessments of unauthorized distributors
- Provide counterfeit part detection training to MDA and its contractors
- Perform counterfeit part detection testing at the NSWC Crane Failure Analysis Laboratory

Additional NSWC Crane Support includes:

- Supports Agency-level contractor compliance audits
- Commercial-Off-The-Shelf assemblies
- Printed circuit board technology
- Power systems analyses
- Battery research, analyses, testing and qualification
- Safety and risk assessments of battery technologies proposed for use by MDA contractors
- Stockpile reliability

Total annual MDA funds provided to NSWC Crane across all above areas is \$5.9 million. The President's budget request for fiscal year 2014 as well as previous years has fully funded MDA's requirements in the areas identified above and currently additional funding is not required to meet these requirements. All of MDA's highest priorities have been fully funded.

SUBCOMMITTEE RECESS

Senator DURBIN. We'll set a classified briefing at your convenience and the convenience of the members.

And the meeting of the subcommittee stands adjourned.

[Whereupon, at 9:55 a.m., Wednesday, July 17, the subcommittee was recessed, to reconvene subject to the call of the Chair.]